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THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

MARCH
954

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A Unique History

LAST month the Devoe & Raynolds Company, the oldest firm in the paint business and the oldest manufacturing company of any kind in New York City celebrated its 200th anniversary.

Entering into the third century of business, Devoe & Raynolds can take special pride in its unique history and development. The firm's founder was William Post who ground colors in his home down on Burling Slip, which is part of today's downtown section of New York City. Actually Post's trade was considered that of a painter and glazier in those days. Succeeding generations of the Post family operated the business, and it was not until the middle of the 19th century that the firm's present corporate name, Devoe & Raynolds, came into being. In 1851 F. W. Devoe was hired by Charles T. Raynolds, the sole owner. He later became Raynold's business partner, and according to company officials played an important part in the development and expansion of the firm. Under his direction, the firm moved to Fulton Street and operated a retail store until 1937. He was also instrumental in having the firm build a factory on Horatio Street, which is located in Greenwich Village. The first foreman of this factory was Andrew Jackson Phillips, grandfather of E. S. Phillips, the present Chairman of the Board.

Devoe & Raynolds presently operates eight plants. Seven produce paints, enamels, finishes, varnishes and vehicles, while one plant is engaged in the manufacture of brushes.

The company did a volume of close to 50 million dollars in 1953, which was considered the highest in the 200-year old firm's history, according to J. Harold Kolseth, vice president in charge of All Trade Sales Divisions.

The real growth and expansion of Devoe & Raynolds took place when E. S. Phillips and a group of 15 executives bought control of the business in 1924. Immediately, the firm embarked on an intensive expansion program by building new plant facilities in Brooklyn, Newark and Chicago, and acquiring other established paint producing companies. Thus, Devoe & Raynolds became a national operation, manufacturing a complete line of products. It entered into the industrial finishes field in 1933, when the Jones-Dabney Company of Louisville was acquired.

One of the contributing factors for the steady growth of this firm is the foresight of its management in making research and development an integral part of its policy. Over a million dollars are budgeted for this purpose each year. Out of this came such developments as a one-coat house paint, improved processing techniques for making alkyd resins, a new resin with remarkable physical and chemical properties, special paints to meet the market of the "do-it-yourself" trend in home maintenance and decoration.

These forward steps taken by Devoe & Raynolds exemplify the great strides that the paint industry has made within the past 25 years. It is but a further proof of the fact that research will continue to open up hitherto unheard of opportunities, and meet whatever challenges the future may present.

In recognition of the contribution this firm has made not only to metropolitan New York but also to the nation, Mayor Robert F. Wagner officially commended E. S. Phillips, chairman of the board in a special ceremony marking the completion of the firm's 200th anniversary.

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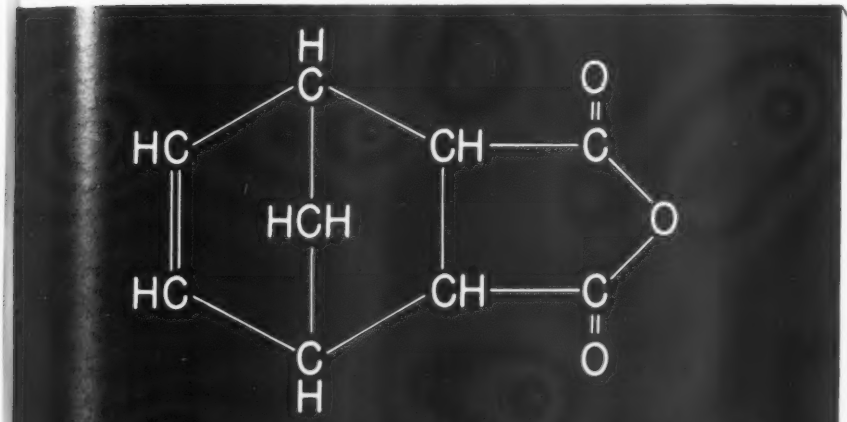

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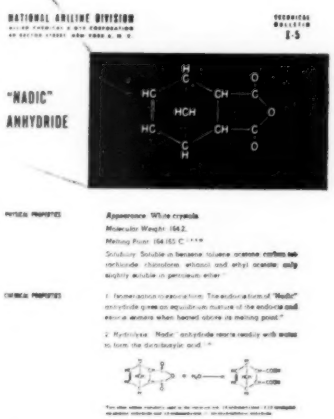

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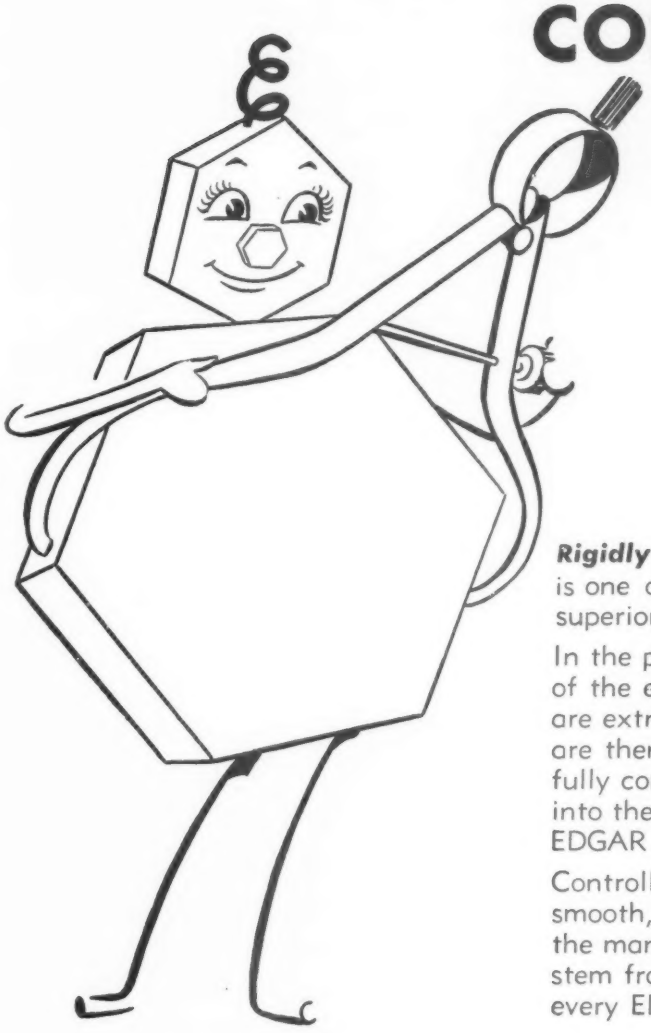

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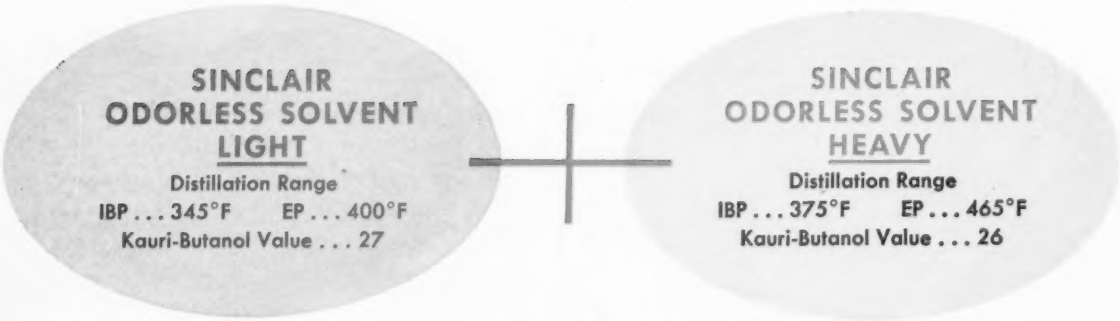

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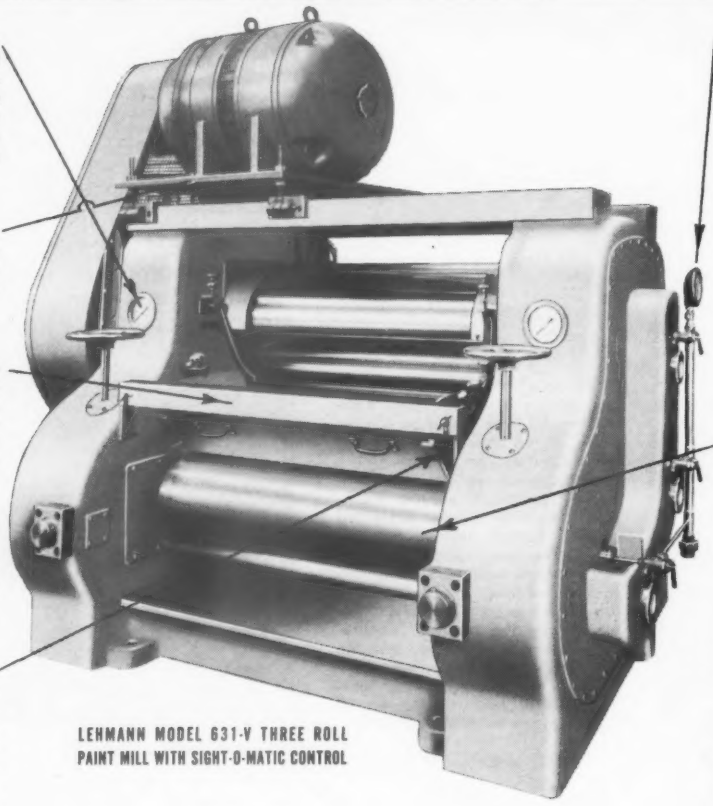

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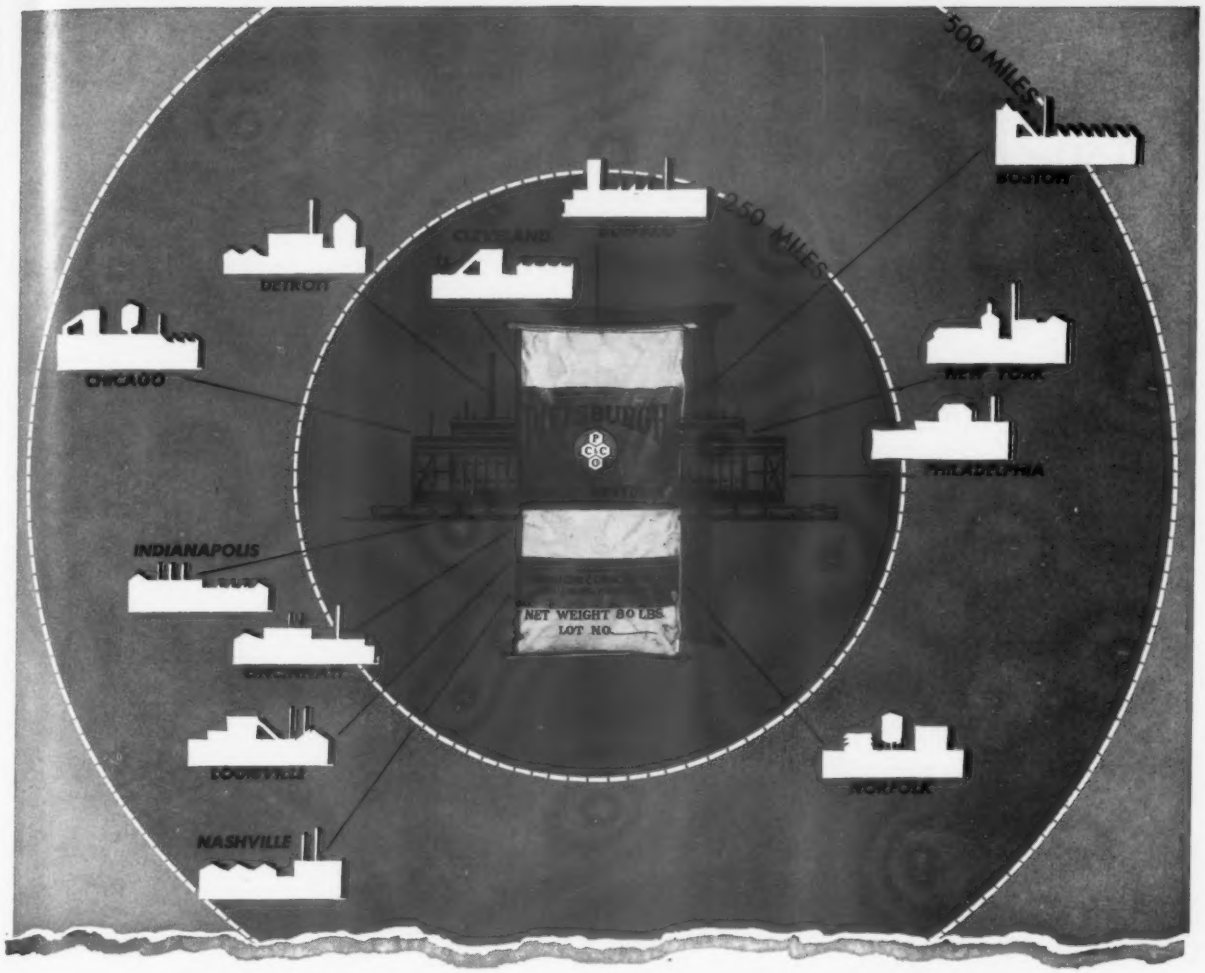

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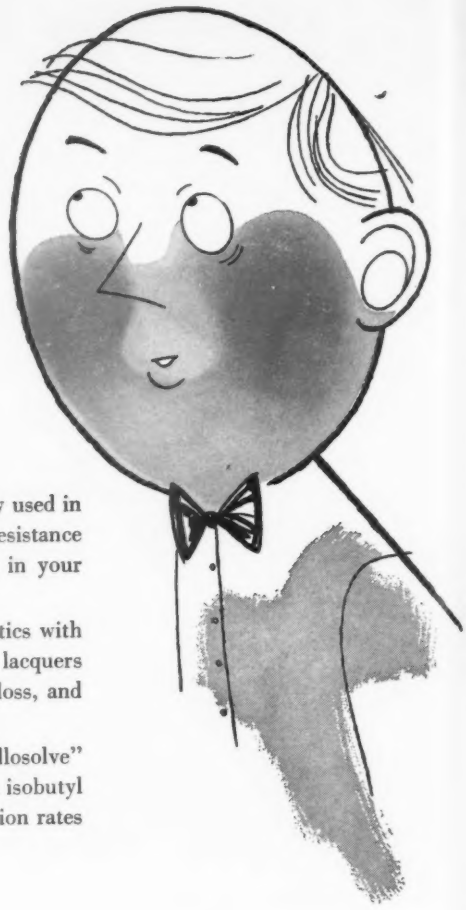

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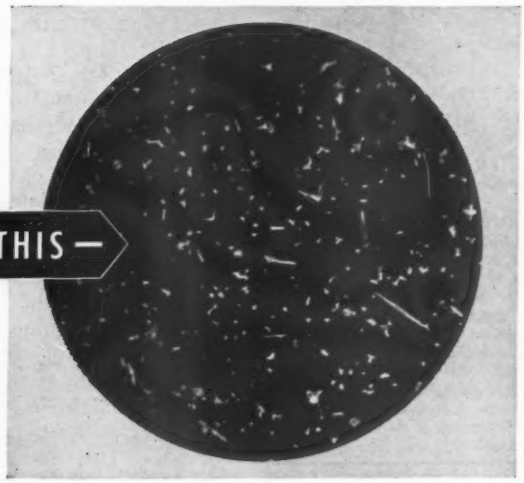

Microscopic view of zinc oxide showing high degree of nodularity, low acicularity

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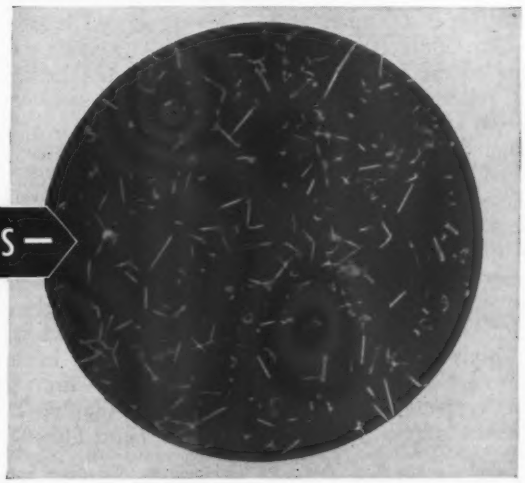

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GROWTH OF FUNGI ON PAINT FILMS

By DR. K. MEIER
and
H. SCHMIDT

DESTRUCTION of paint films is due not only to the action of moisture, heat, cold, sunrays and mechanical influences, but in a much higher degree to the growth of fungi. In the past, this type of destructive influence has found due consideration only in isolated instances[1].

Formation of fungi on paint films may cause appreciable damage within a very short period of time and may even influence the reliability of the results of scientific and technical investigations, such as outside weathering tests, etc. The action of fungi is not limited to the surface of paint films but extends throughout the entire thickness of the films by means of their mycelium, or spawn, through which they draw their nourishment. They thus destroy the structure of paint films which, as a consequence, are attacked much more rapidly by weathering influences, etc. In view of the importance of the growth of fungi on paint films, the authors decided to study the fungi in question, the factors favoring their formation and growth, and the degree of sensitiveness of the various paint vehicles toward their growth —as well as the influence of pigments, properties of paint films attacked, and the influence of toxic additions to paints.

It was realized that these investigations could only serve as an introduction to the systematic study of fungi growth on paint films.

The publication of this article is the result of numerous requests by our readers for more and complete information of the abstract which was published in the July, 1953 issue of Paint and Varnish Production. The German version of this article appeared in Deutsche Farben-Zeitschrift in May, 1952.

The authors are connected with the Paint Research Laboratories at the Technical University of Berlin.

Kinds of Fungi (Botanical Data)

The higher types of fungi able to attack paint films (the eumycetes) belong to the family of the thallophyta, together with the algae (sea weeds) and lichens. These species belong to the lowest types of plants which are best described by negative characteristics[2]. They possess neither vascula nor roots, and their sporangium (i.e. the spore-producing cases or containers) are rarely surrounded by envelopes of sterile cells. The vegetative body of the higher types of fungi usually exhibits fine threads (hyphens), the totality of all hyphens representing the mycelium of a fungus. The sporangium with its sexless spores is connected with the richly branched septated (partitioned) mycelium. Subdivision of the various types of fungi is determined, or governed, by the shape of the sporangium. In one of these types, the ascomycetes (tubular fungi) endogenous and exogenous spores can be produced. The endogenous spores are formed within a tubular product called ascus (Figure 1), while the exogenous spores (conidias) are produced on the conidia carriers. The entire claviform sporangium is called the basidium (Figure 2). Most of the fungi growing on paint films belong to the group of the ascomicetes, another group to be mentioned being the so-called fungi imperfecti; this is a type of hyphen fungus, of which only the conidia (germ cell removed from the mycelium) are known, but not the asci or basidias respectively, and whose formation is suppressed in most instances.

Technical literature recognizes the following types of fungi growing on paint films:-

Figure 1. Tubular Sporangium (Asci).

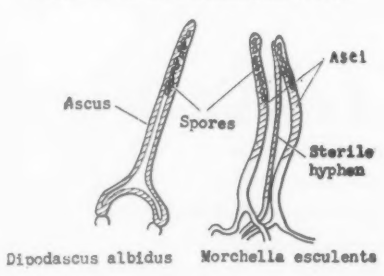
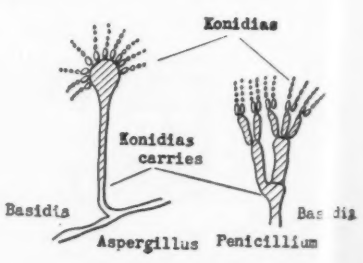


Figure 2. Claviform Sporangium (Basidia).



P nicillium and aspergillus (Gardner[3])
P llularia, dematium (Goll, Coffey and Smith[4])
T rula (Kempf and Peters[5])
P rianxantha (Wilson-Mc.Miken[6])

C her types of fungi mentioned are: Barya, monilia, phoma and cladosporium.

For the purpose of these investigations, objects exposed to weathering influences were painted blue and yellow (a garden fence painted blue and a brickwall painted yellow) and examined for the presence of fungi colonies which were recognized by greenish or dark gray discolorations of the paint films. Samples taken from these colonies were placed on linoxyn films two weeks old and left to develop in moist rooms at room temperatures. After about four weeks an area measuring about 50 sq.cm. (7.75 sq. in.) had been attacked by the fungi mycelium. Figure 3 shows a microphotograph of this mycelium magnified 100 times in which the individual mycelium hyphens are clearly recognizable. For purposes of identification the fungi samples were cultivated on various nourishing soils, yielding four different types of fungi as characterized in Table I. Of the fungi mentioned in Table I the white fungus B grew much more rapidly than the others. In view of the fact that it was possible with the aid of this fungus to considerably reduce the duration of experiments, this was used in all further experimental work. We have been unable as yet to accurately determine, or identify, this white fungus B, but it probably belongs to the class of the fungi imperfecti.

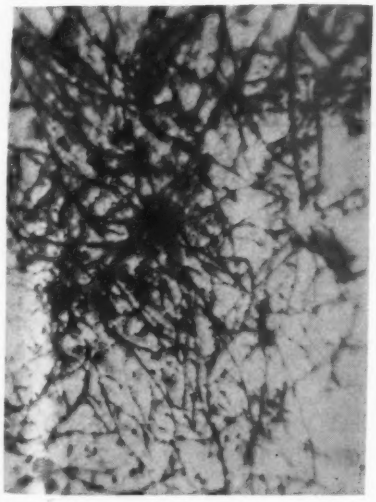


Fig. 3. Mycelium of fungi in linoxyn paint film. Magnification 60X.

Table I

Fungus	Color	Class	Order	Family	Genus
A	black	fungi imperfecti	—	—	dematium
B	white	fungi imperfecti	—	—	
C	green	ascomicetes	Plectascales	aspergillaceae	penicillium
D	yellow	fungi imperfecti	—	—	monoverticillium

Types of fungi used in study.

Conditions of Growth

It is obvious that growth and propagation of fungi can take place only if general conditions are favorable. Knowledge of these conditions offers the possibility to prevent, or at least minimize the growth of fungi by suppressing all conditions favorable to their existence. These conditions correspond chiefly to those required for the existence of all organic life and can be summed up as follows:-

a) Nourishment:- Nourishment is absorbed through the mycelium of the fungi. The latter are not in a position like other plants to produce their organic nourishment necessary (such as the carbohydrates) from simplest organic substances themselves but require organic carbon and nitrogen sources (heterotrophy). Nutrition must therefore be drawn either from dead organic substrata (saprophytic) or from live substratical substance (parasytic). Most of the fungi growing on paint films are of the former type and can therefore be cultivated artificially. Regarding their nitrogen nourishment some fungi are able to react quite autotrophically. For instance, aspergillus is fully able to grow on a substrata containing nothing but a little sugar. Glycogen and fat are extensively used as reserve nutrition by the fungi.

The fungi growing on paint films draw their nourishment from

1. The paint vehicles themselves,
2. The underground of the paint films (wood), or from
3. Sources of nourishment outside the reach of the paint films.

b) Temperature:- Temperature conditions either favor or suppress the chemical reactions of assimilation and thereby determine the rate of growth of fungi. In the case of the fungus B used in the experiments fungi growth was entirely suppressed at a temperature of 0 degree Centigrade (32°Fahr.), while the most favorable temperature appeared to be about 20 degrees Centigrade (68°Fahr.).

c) Moisture:- The experiments indicated that moist atmospheres exert a considerable influence on the growth of fungi, moist warmth being the most favorable. This influence of moisture might be due to two main reasons:- The nourishment is better utilized (or utilized to greater advantage) by the mycelium of the fungi while, on the other hand, moisture induces swelling in a number of paint vehicle groups, rendering them softer and mechanically less resistant against the action of the propagating mycelium of fungi.

d) Light:- This also exerts a slight influence on the growth of fungi, although the real direct reason for this apparent influence appears to be connected with a corresponding increase of temperature of the vegetative phase. There is no specific influence of light such as is indicated in the case of plants containing chlorophyll, in which assimilation must be induced by light rays.

Behavior of Vehicles

After fixing the most important experimental conditions as outlined above, the next important feature appeared to be the behavior of the main constituents

Table II

GROWTH OF FUNGI ON VEHICLES

Vehicle	Time of Growth in Days 3	6	12	18	24	30	36	42	48	Rate of Growth mm./day
	Diameter of attacked area in mm.									
Dextrine	12	18	35							2.90
Phenol resin	5	16	35							2.90
Modern phenol resin (Albertol 347 Q)	8	16	25	35						1.90
Oil alkyd resin (Alphtalate 423 D)	6	13	24	35						1.90
Methyl cellulose	8	14	22	30						1.70
Nitrocellulose	10	15	22	30						1.70
Varnish linseed oil	6	8	16	21	29	35				1.20
Crude linseed oil	6	8	16	20	31	35				1.20
Cellulose acetate	5	9	15	22	26	31	35			0.97
Asphaltum (Gilsonite)	5	8	12	15	26	29	35			0.97
Plastic urea resin (Resamine 316°F.)	5	15	18	21	25	29	35			0.97
Linseed oil stand oil	4	8	12	16	22	25	29	32	35	0.73
Oiticica oil	3	8	12	15	20	22	26	27	31	0.65
Chlorinated rubber	4	8	12	14	18	23	25	28	31	0.65
Polyvinyl acetate	4	12	20	22	23	24	25	28	31	0.65
Wood oil	4	5	8	11	16	20	22	27	30	0.62
Poppy oil	3	4	5	6	7	8	11	14	17	0.34
Cumarone resin	5	6	8	10	12	14	15	16	17	0.84
Colophony	4	5	6	8	10	12	13	14	15	0.31
Dammar resin	3	4	5	6	8	10	11	12	13	0.27
Shellac	0	0	0	0	0	0	0	0	0	0.00

of paints, the vehicles. These include the specific resistance of some combinations against fungi growth and the properties most favorable to the attack, development and propagation of fungi. In order to answer these questions satisfactorily a number of vehicles were studied. Films 0.010 mm (10μ) thick were applied to glass panels 50 x 50 mm, sufficiently dried and finally inoculated with the fungi sporangium (size of colony less than a pinhead). These samples were then transformed to Petri-trays containing some water (covering their bottom), ensuring a comparatively high degree of moisture, or humidity. The other general experimental conditions applied were room temperatures (about 20 degrees Centigrade) and normal natural light conditions.

In order to obtain quantitative results with regard to the growth of fungi, control of the rate of growth, or propagation, was carried out by measuring within definite periods of time the diameter of the attacked area under a microscope and calculating the rate of growth in terms of mm./day. Table II shows the results obtained.

It is recognized, of course, that these measurements cannot lay claim to absolute accuracy since the mycelium of fungi does not always spread perfectly radially, while the density and thickness of the mycelium must also be considered. It is possible nevertheless to arrive at comparative conclusions. The items mentioned in Table II are arranged in a decreasing order of fungi attack. The hard resins such as colophony, dammar and shellac, which are almost insoluble in water take last place, while the swelling substances such as the various oil oxynes and polyvinyl acetate assume intermediate positions. It is obvious, therefore, that the vehicles swelled up and softened by moisture are most easily attacked by fungi growth. Apart from shellac, all vehicles were attacked, including even phenol resin in which small amounts of free phenol may have exerted a toxic effect on the fungus growth. However, it was impossible to verify the latter assumption.

Figure 4 shows the growth of the mycelium of fungi from the point of inoculation in one direction within the period of observation for dextrine, stand oil, and colophony as vehicles. The curve lines indicate that the rate of growth is not entirely linear even under uniform external conditions of influence.

Influence of Pigments

The following factors determine

Fig. 4. Linear growth of fungi on vehicles.

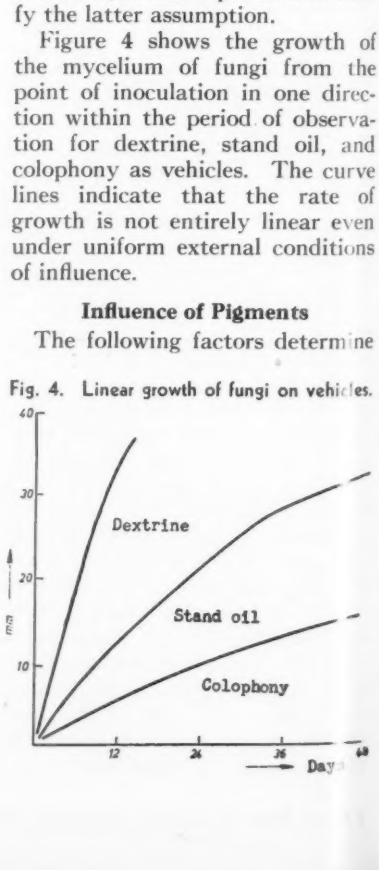


Table III

GROWTH OF FUNGI ON PIGMENTED LINSEED OIL

Pigment 2%	Time of Growth 3	6	9	12	15	18	21	24	27	30	Rate of Growth mm./day
	Diameter of attacked area in mm.										
Chromium oxide green	5	6	8	13	17	21	23	26	28	32	1.07
Chalk	4	5	6	9	13	16	18	20	22	25	0.83
Heavy spar	3	5	7	9	10	12	14	15	17	20	0.63
Manganese black	2	4	7	8	12	13	14	14	15	15	0.50
White lead	3	4	6	8	9	10	11	12	14	15	0.50
Red oxide of iron	3	4	6	8	10	11	11	12	13	13	0.43
Bremen blue	2	3	5	7	8	9	10	11	13	13	0.43
Chromium yellow	3	3	4	6	7	8	10	11	12	12	0.40
Scheele's green	2	3	4	4	5	7	7	8	9	10	0.33
Lenzinite	2	2	3	3	5	5	6	6	7	7	1.23
Lampblack	2	2	2	3	4	5	6	6	7	7	0.23
Neapoli yellow	1	1	2	3	3	4	5	5	6	7	0.23
Cadmium yellow	1	1	2	3	3	4	4	5	5	6	0.20
Zinc white	1	2	3	3	4	4	5	5	6	6	0.20
Zinc sulfide	1	2	3	3	4	4	5	5	6	6	0.20
Red lead	1	2	2	3	4	4	4	5	6	6	0.20
Cinnabar	1	1	2	2	3	4	5	5	6	6	0.20
Parisian blue	0.5	0.5	1	2	2	3	4	4	5	5	0.17
Titanium dioxide	0.5	0.5	0.5	0.5	1	1	1	2	2	2	0.07
Varnish linseed oil	6	8		16		21		29		35	1.17

the degree of influence of pigments:-

1. Size and shape of the pigment particles, since these exert a mechanical resistance against the propagation of the mycelium.

2. Possible toxic influence of pigments.

3. Formation of non-volatile and oxidizable products due to the decomposition of the oil films, and reaction products due to the decomposition of both oils and pigments.

4. Influence of the products of assimilation of fungi on the pigments.

These tests were carried out with linseed oil as vehicle since this is known to favor fungi growth. After adding two percent of the pigment tested and thoroughly mixing, the paint was applied on to small glass panels. Experimental conditions generally were the same as outlined above. Pigment concentration was intentionally maintained low in order to permit easy observation of fungi propagation under the microscope. The diameter of the area attacked —in mm.—and the rate of growth in terms of mm./day were calculated. The results of these experiments are shown in Table III, the pigments being arranged in the decreasing order of suppression of fungi growth.

Table III indicates that at the concentration selected no pigment was able to entirely suppress fungi growth. Even the pigments known to exert strongly toxic effects, such as Scheele's green and white lead, did not show definite specific poisonous influences, proving that the fungus B used in these experiments is very resistant against these toxic agents. Growth of fungi is retarded by the presence of pigments, the rate of growth being lower in all cases of pigmentation of pure vehicles. A chief reason for this fact is the mechanical resistance of pigment particles against the propagation of the mycelium, although other factors may exert some additive influence. Figure 5 shows a linoxyn film containing

Fig. 5. Mycelium of fungi in linoxyn paint film pigmented with Pb_2O_4 Magnification 60X.

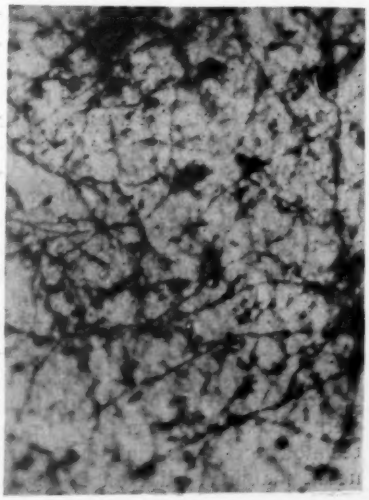


Table IV

Comparative Investigation of Linoxyn Films Attacked and Unattacked by Fungi Growth

	Normal Film	Attacked Film
Hardness	3-4[8] moderately hard to soft	4-5 soft to very soft
Adherence	3 moderately adherent	— chipping impossible film is pushed together
Elasticity	3 moderately elastic	— same as above
Degree of solubility in alkalies	5.3% loss of weight	57.3% loss of weight
Swelling days	increase of weight %	increase of weight %
2	14.1	15.5
6	24.2	213.0
10	46.5	401.0
14	58.3	442.0
18	65.8	450.0
22	67.2	438.0

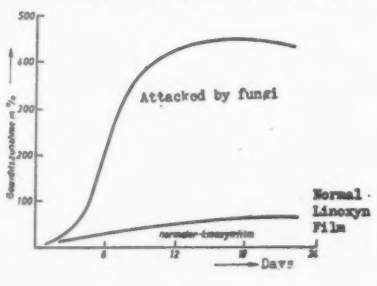
2 percent of red lead attacked by fungi. The black area on the lower edge of the picture is the place of inoculation, from where the mycelium of the fungus radiates fan-shaped over the entire surface of the film.

Properties of Paint Films Attacked by Fungi Growth

The question concerning the properties of paint films attacked by fungus growth, naturally, is of maximum importance since it decides the life and usefulness of the films. Since, in most instances, the fungus draws its nourishment from the paint vehicle this is gradually used up and accompanied by the destruction of strength and structure of the paint films themselves. Films of this type must, therefore, be less resistant to the influence of external chemical, physical, and mechanical influences in every respect. In order to prove this fact experimentally, two series of linoxyn films were prepared, only one of which was inoculated with mycelium. Both films were otherwise treated absolutely identically. After two weeks of drying they were subjected to a series of simple technological tests including hardness, pliability, adherence, degree of solubility in alkalies and swelling capacity.

The results of these tests have been arranged in Table IV. They prove that hardness, adherence and elasticity are considerably reduced and that the degree of solubility in alkalies increases by more than 1000 percent. This fact is clearly indicated in Figure 6 showing the swelling of films attacked and unattacked by fungi growth. It is shown that the degree of swelling of the attacked films increased seventyfold. This is due to the affinity of the mycelium for moisture and to the presence of capillary channels formed by the mycelium of the fungi which tend to draw up the moisture by capillary action. Another factor of importance influencing the degree of swelling are the products of assimilation left in the mycelium. All these factors combine to deteriorate the film properties to such an extent as to entirely destroy the surface protecting capacities of paint films.

Fig. 6. Comparative swelling of linoxyn film attacked and unattacked by fungi. The vertical axis of the graph represents increase in wt. (%).



Protection Against Fungi Growth

There are two possibilities of protecting paint films against the formation and growth of fungi, 1) to remove all conditions favorable to their development by drying or cooling to temperatures below or above the critical ranges. Dry heat or very low temperatures render fungi growth impossible in most cases. A second method of protection is to provide the vehicle with substances exerting a toxic influence on the fungi. In order to test toxic effects a number of such substances were added to linseed oil in amounts of 0.2 percent, and 2 percent, respectively. After drying, the films were inoculated with mycelium and left to develop under conditions favorable to the growth of fungi. Table V indicates the compounds used for this purpose and the rate of growth in terms of mm./day. The results obtained show that the addition of most of these substances reduce the rate of growth of fungi in pure linseed oil films by more than 50 percent., although it is not eliminated entirely by any of the substances added. Comparison of the relative effectiveness of the additions of 0.2 percent and 2 percent shows that there is no difference in the case of substances insoluble in oil such as sodium silico-fluoride and zinc chloride or in the case of substances without any toxic influence. Both properties must be combined to change the rate of growth with differently proportioned additions, typical examples of this type being salicylic acid, p-chlor-benzoic acid and phenol. The results of these tests indicate, however, that the phenolic OH-group does not represent a particularly active group toxicologically which, of course, is well demonstrated by the free development and growth of fungi on phenol resins. If comparatively large quantities of these substances are added, attention

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DESIGNING EQUIPMENT FOR VEHICLE MANUFACTURE

By
STANLEY YOKELL P. E., Ch. E.

THE vehicle production man has experienced three distinct periods in his use of vehicle manufacturing equipment. For many many years, vehicle making was a cook's art, carried out in open kettles, stirred with spoons or beaters, with very little application of engineering science to equipment design factors.

Advances in chemistry brought the second period into being. This was the period when closed cooking equipment and solvent cooking were introduced to keep pace with the chemist's knowledge and introduction of synthetic resins. The second period could be characterized as the period of the consultant. A few individuals, fortunate enough to have gained some experience in the design and operation of closed equipment became experts who sold their knowledge to the production man who had been too busy with the daily problems of manufacture to apply the new methods to their own experience. During this period the production man was dependent on the knowledge and judgment of the consultant in the purchase or design of new equipment.

The third period, now upon us, is the period in which the production man has digested his experience with the new type of equipment. His questions on design are pointed and intelligent, and he is full of them.

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Stanley Yokell is a licensed Professional Engineer, with a degree in Chemical Engineering from New York University. He is Vice-President and Chief Engineer of Process Engineering and Machine Co., Elizabeth, N. J. He has been active in the design and supervision of process plants for the manufacture of alkyd, phenolic, and urea-formaldehyde resins. He is a member of the American Institute of Chemical Engineers and the National Society of Professional Engineers.

On the basis of frequency of queries a few design factors have been selected for general review. None of these can be examined alone, since all of the factors affect each other. Some design factors arousing much interest are materials of construction, selection of dimensions, methods of heating, temperature effects on equipment and agitation.

Materials of Construction

Where the color of a vehicle is of no importance, as in vehicles for linoleum manufacture, carbon steel has been used satisfactorily, but for most purposes color is important and the majority of kettles are constructed of one of the 18-8 alloys. Corrosion effects are more serious with respect to color than to equipment strength and life. In all cases, the strength of the material and the effects of temperature on strength must be considered.

Figure (1) is a plot of data from the *1952 Edition of Section VIII of the Boiler Code, Unfired Pressure Vessels.* The data plotted are allowable working tensile strength vs temperature. The graph shows that the weakest material per square inch of thickness is aluminum (even on a per pound basis aluminum remains the weakest of the materials used.) It also shows that at all temperatures carbon steel is not as strong as the 300 series stainlesses or Inconel in tension. The strongest of all of the materials commonly used is Stainless Steel type 316. It also happens to be the most resistant to corrosion by a variety of hot fatty acids. These facts also apply to the 26-20 or 310 type.

The case of external pressure, as with jacketed vessels for Dowtherm heating, or those which may operate under vacuum is more complex and is more difficult to show graphically. However, it is generally true that at the temperatures encountered in vehicle manufacture, type 316 is the strongest, carbon steel second and type 304 weakest.

An interesting sidelight on this

This paper was presented before the Vehicle Manufacturers Group Meeting, New York Paint, Varnish and Lacquer Association, on February 10, 1954.

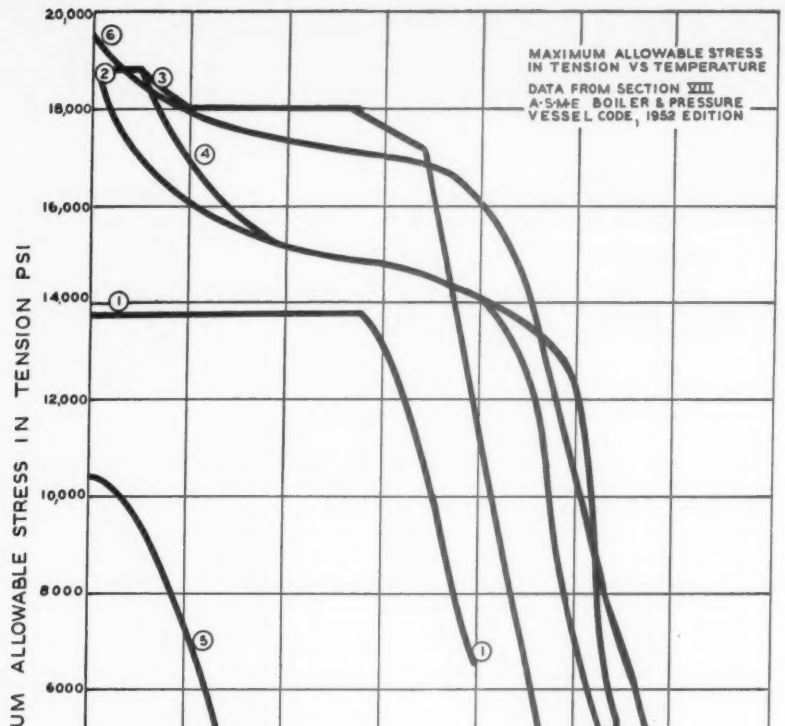

Figure 1. Plot of allowable working tensile strength vs. temperature. No. 6—Annealed Type

situation concerns the economy minded purchaser of a Dowtherm heated autoclave who insisted on the use of type 304. When the kettle manufacture presented the facts and figures the purchaser was shocked to learn that he could buy a 316 kettle for approximately the same price as the one in 304, since the 316 unit required a lesser wall thickness. The additional resistance to corrosion and lessened resistance to heat transfer were welcome bonuses.

The decline in strength with increasing temperature makes it extremely important to choose realistic design conditions for Dowtherm heated vessels. Because of the pressure-temperature relationship of Dowtherm, the higher the jacket working pressure specified, the higher the working temperature must be. Both factors tend to increase vessel wall thicknesses. Therefore, it is wasteful and expensive to design for conditions in excess of 10% above the anticipated maximum operating conditions.

For Dowtherm equipment, the use of stainless clad carbon steel may provide some economy. Against the use of clad material are two facts. First, it is a rule of the Code that the cladding thickness may be counted in computing the required thickness of the part under consideration, however the allowable working stress used must be the lesser of that allowed for either of the metals that compose the clad plate. Alternatively the cladding thickness may be disregarded and the stress value used that applies to the base metal. Thus, where 304 clad carbon steel is used, the design stress will have to be that of the 304 layer (less than that of carbon steel in this case) or the thickness of the stainless layer must be neglected in the calculation. Second, in the welding of clad steels a certain amount of solution of the lower alloy with the higher is inevitable. This may affect the corrosion resistance at the welds.

Heat treatment may be employed where it is desired to bring out the maximum corrosion resistance of the welded portion. 18-8 stainless steels may be considered as similar to materials in a state of arrested supersaturation. Heating to welding temperatures and slow cooling permits the precipitation of carbides which are not corrosion resistant. The corrosion products cause darkening of the cook. By heating to temperatures in the correct range, and water quenching or air cooling at the proper rate, the welded zone is restored to its state of arrested supersaturation. Even stabilized materials can be improved by heat treatment.

Recently, a vehicle manufacturer asked, "Can an improvement in color be obtained by using a 316 mixing impeller in a 304 installation?" The question is a thought provoking one. Stainless steels depend on the formation of a film of oxide on the surface for corrosion resistance. A high flow rate which might remove this film by abrasion could reduce the effectiveness of the alloy in resistance to corrosion. A study of the relative effects of impellers versus containing walls would require comparisons of linear flow velocities past the impeller surfaces and past the walls, and of the surface areas involved. The latter are simple to compare, but the former are not. Some effect might be anticipated.

Selection of Dimensions

The selection of dimensions depends on several factors besides space available for the equipment. For direct fired kettles, the primary heating surface is the bottom head. The surface available for heat transfer per given volume of batch varies as 1/batch height. Therefore the short squat kettle provides the most heat transfer

sur ce per unit volume. The str gth of the vessel under either vac um or internal pressure decre es for a particular thickness of : etal with increasing diameter. Th cost also increases as diameter inc ases for a given volume. Head thi nesses increase as does the tot quantity of metal required to ntain the volume.

When Dowtherm heated units are considered, strength of materials plays an even greater part in the selection of dimensions. The long slim shape under collapsing pressure requires less thickness and is cheaper.

If solvent cooking is to be the method of operation, consideration must be given to the free liquid surface available for vaporization and the depth of liquid which must be scavenged by the solvent. The effects of dimensions on agitation should be noted at this point. Solvent systems have occasionally been fitted with a turbine and propeller mounted on a common shaft. The function of the propeller is to drive solvent into the depths of the batch by reason of its axial thrust. When solvent is not driven into the batch, it flashes at the surface, and with some cooks will not remove water of reaction. This extends the time required for reducing the acid number. The deeper the batch, the more pronounced is this effect. Thus if long, deep kettles are to be used, agitation must be adequate to overcome these effects.

Comparison of Heating Methods

To compare heating methods it is well to examine some of the processes of heat transfer. Inside the kettle, the greatest resistance to the flow of heat is a thin film of slowly moving batch adjacent to the wall. The more vigorous the agitation, the thinner this film becomes and the faster heat is transferred. Effects of agitation are thoroughly discussed in the literature. Outside of the kettle, the heat transferred for the radiantly heated system depends directly on the difference of the fourth powers of temperature of the source and of the kettle wall, inversely on the square of the distance between the source and the wall and on the ability of the wall to absorb and subsequently transmit heat. Direct

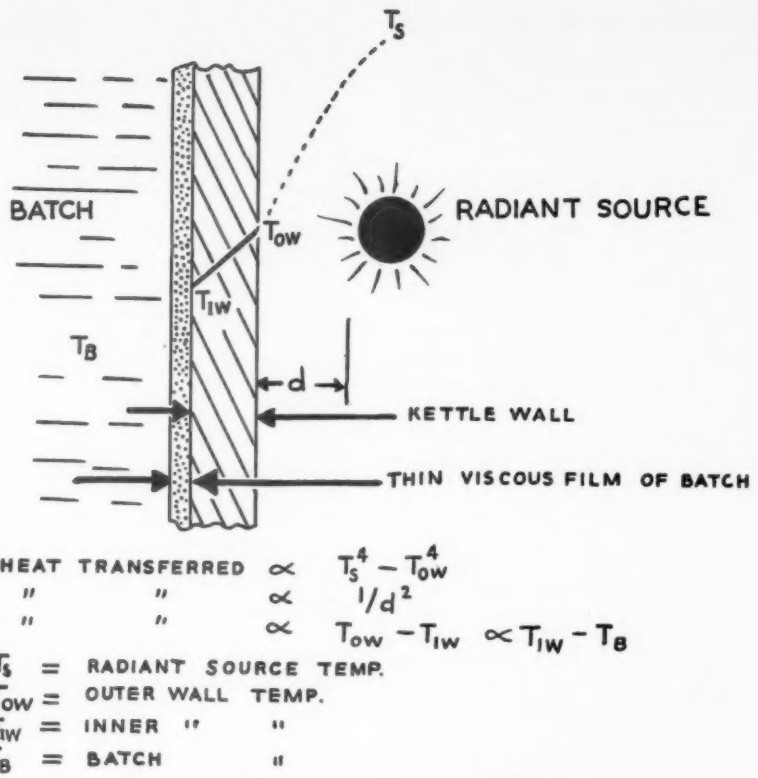

Figure 2. Schematic diagram showing heat transfer process.

fires units receive more radiant heat than electrically heated units because of higher source temperatures, but electrically heated units are compensated somewhat by the ability to place the source closer to the kettle wall, and the greater surface available for the transmission of heat.

The case of Dowtherm heating is different in that heat must be transferred from the condensing Dowtherm to the kettle wall. The condensing vapor offers some resistance to heat flow. Dowtherm temperatures above 650°F are not customarily attained and the driving force of temperature difference is lower than with radiant types. Increased surface for heat transfer in comparison with direct fired types compensates for this effect.

It is rare to see vehicle equipment heated by hot oils. The reason is that, in addition to the resistance of the batch side film to heat flow, the hot oil also has a thin film adjacent to the exterior surface of the kettle which resists the flow of heat. The mass of hot oil in the jacket flows at a lower rate than that inside the kettle and is further caused to approach viscous flow conditions because of its helical path. Therefore, the film of heat transfer oil adjacent to the wall is relatively thick and heat transfer is poor. Furthermore, it is difficult to obtain a heat transfer oil that will withstand continuous use above 600°F without rapid deterioration. Figure (2) shows the heat transfer process schematically.

Temperature Effects

Aside from metallurgical effects and the chemical effects of oxidizing atmospheres, the principal effects of temperature on equipment are those resulting from thermal expansion and contraction. The worst thermal effects are experienced when inner parts are cold and outer parts hot, as during heat up, and when outer parts are cold, when inner parts are hot, as during cooling. However, even when the shell and jacket have been heated from room temperature to cook temperature, severe thermal stresses may exist due to the difference in thermal expansion coefficients of the dif-

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GLYCERINE — TODAY AND TOMORROW

By E. SCOTT PATTISON*

"ABUNDANCE, in some cases even super-abundance, is the outstanding theme of the news of business". So wrote the *Wall Street Journal* a few weeks ago. Within the chemical industry, which spent a record 1.6 billion dollars in 1953 in expanding its capacity, the pressures of abundance have supplanted the problems of scarcity pretty well all-across-the-board.

For many of these products, the post-war years have shown tremendous increases in output. Ethylene glycol, for example, rose from 200 million pounds in 1945 to over 700 million in 1952. Its production dropped back some 15% in 1953, and its price has recently been cut from 17 to 14-½ cents per pound. But in most cases, abundance of materials has been a key to continued product expansion. The plastics industry, which is estimated to have risen 30% in 1953 over 1952, is a striking example. New markets for polyethylene have been opened up in squeeze-bottles, for polyester resins in glass-fiber structural parts, and for polyvinyls in floor tiles. Here, new capacity is being regarded as a growth factor rather than a sign of weakness.

In considering the present and future position for glycerine, we must start from this background of growth and general chemical abundance. Some products whose capacity has been increased, like pentaerythritol, are serious competitors for glycerine. Others, being used jointly with glycerine, can by their abundance be expected to broaden glycerine use. Phthalic anhydride and related dibasic acids are one example. Cellophane using glycerine as a plasticizer is another.

Glycerine had its peak production year in 1950. Production in 1953 was less than 5 percent below this peak. Demand has been steady at a level between 18 and 20 million pounds per month for four years. Net imports have been growing. The historical relationship between general business activity and glycerine consumption has been maintained. All things considered, it seems safe to say that 1954 will find glycerine supply fully adequate to meet the demands of an economy of abundance. It should be free from the "feast or famine" effects that have driven customers to seek substitutes in the past, or to anticipate indigestible market gluts.

Let us check the 1953 figures of the Department of Commerce to see why this steady availability appears likely. During 1953, domestic output of crude and synthetic glycerine will have totalled (on a 100 percent basis) about 218 million pounds or 30 million pounds above the 1952 level. As shown in Figure 1, this output was consistently higher than the 1952 level, despite reduced soap production. About one-quarter of this total is synthetic production and the gain here, as compared to 1952, was perhaps 18 to 20 million pounds. However, domestic glycerine made available from fats appears to have risen some 8 to 10 million pounds as well. This surprising rise, in the face of falling soap production, can be ascribed to two factors:

1. Use of better grade fats in soap making and a proportionate increase, relative to total pounds of soap produced, of higher grades where glycerine yields are at a maximum.
2. Greater production of glycerine as a co-product of fatty acids and fatty alcohols.

On top of the 1953 domestic total of 218 million pounds of glycerine, we find a striking rise in net imports. These reached a level of some 30 million pounds (Figure 2) the highest on record except for one abnormal year way back in the twenties.

Some of this imported crude is known to have been a long-time accumulation moving here

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This paper was presented before the Glycerine Division Meeting of the 27th Annual Convention of the Soap & Glycerine Producers, Inc., Waldorf Astoria Hotel, New York, N. Y. on January 27, 1954.

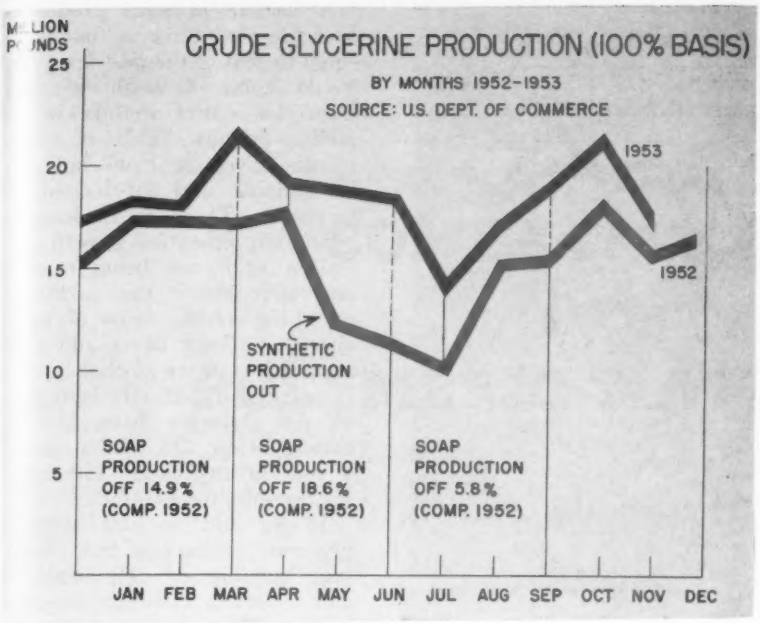
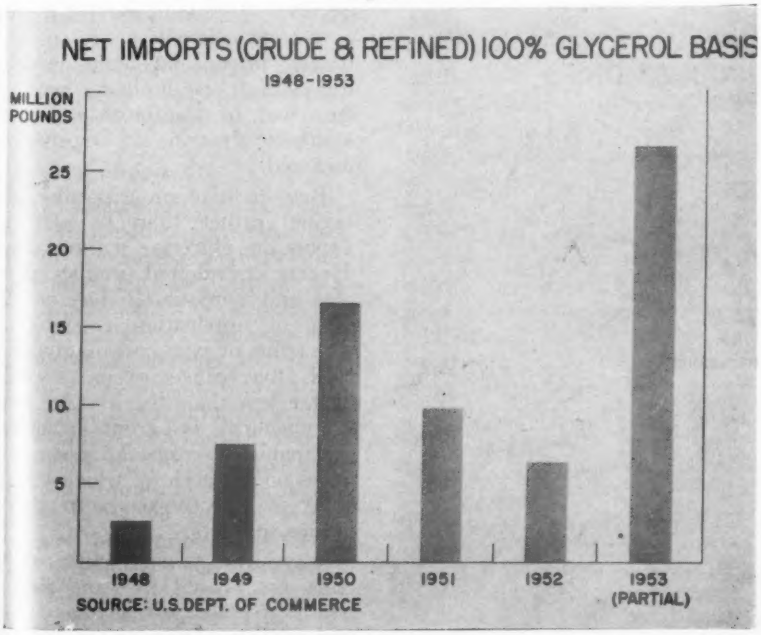


Figure 1

because of an abnormal need for dollar exchange rather than finding its normal world market. As has frequently occurred, however, the import-export balance served its historic purpose in helping to adjust supply and demand. As a result, year-end stocks, estimated from government figures, are again back in the normal stage equal to three months consumption or approximately 60 million pounds. This is in contrast to one year earlier when a low level of stocks was being exploited by competitive polyols as a danger signal for scarcity ahead. At the same time, we are avoiding another extreme of the past which found glycerine stocks of over six months normal consumption on hand.

For we can easily see from government figures that glycerine usage in 1953 has also out-paced 1952 and 1951. With December estimated, the total for last year is 225 million pounds (Figure 3). The significant factor here is that glycerine has held up in 1953 while some abundant, so-called substitutes showed declines. This market maintenance, of course, is the factor that helped attract record imports to our shores.

Figure 2



Unfortunately, accurate end-use trends in glycerine consumption from year to year have not been made available by government figures. A survey which we made in 1950 indicated that at least one-third of all glycerine went to the alkyd resin and protective coatings industry. This proportion is probably equally true today. Other markets for glycerine, particularly cellophane, tobacco, drugs and toiletries, have been relatively stable since 1950. One field of growing importance has been that of monoglyceride emulsifiers for margarine and shortening, and for other food and industrial uses. Glycerine in explosives is perhaps declining with the increased use of certain other polyols and in military explosives with defense curtailment. Basically, we have about 60% of all glycerine moving out in thousands of different directions to small and relatively stable markets, all growing along with a general industrial and population growth. Then, we have about 40% representing alkyd resins and other chemical uses in which the swings with business conditions are relatively great.

A real key to glycerine's short-term availability and value may lie in sales predictions of the products on which alkyd resins are widely used. The operating rate of lines of refrigerators and kitchen cabinets, automobiles and home interiors may effect glycerine's future in a more striking way than supply factors or substitution factors which receive so much emphasis. Let me trace for you in the next Chart (Figure 4) the recent relationship between the general index of business activity and the use of glycerine. As you will note, there is a general similarity to the curves, with glycerine leading here and lagging there, as compared to industrial activity. Note that the colored background of this chart indicates the general price level for glycerine existing at the time—under 30—30 to 40—and over 40 cents. Here, glycerine has been freely available

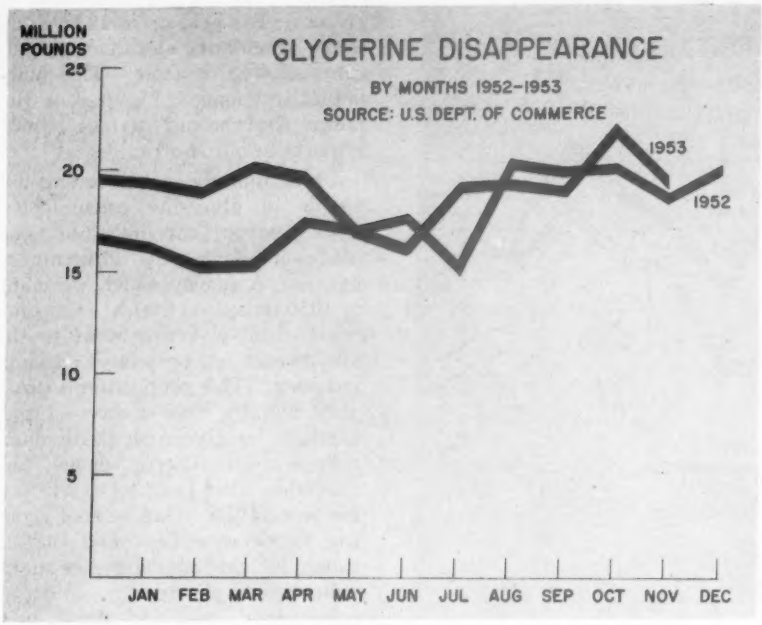


Figure 3

and has out-paced the business index. Here, the price of glycerine undoubtedly became a factor as stimulating substitution, and a lag below the general business curve occurred.

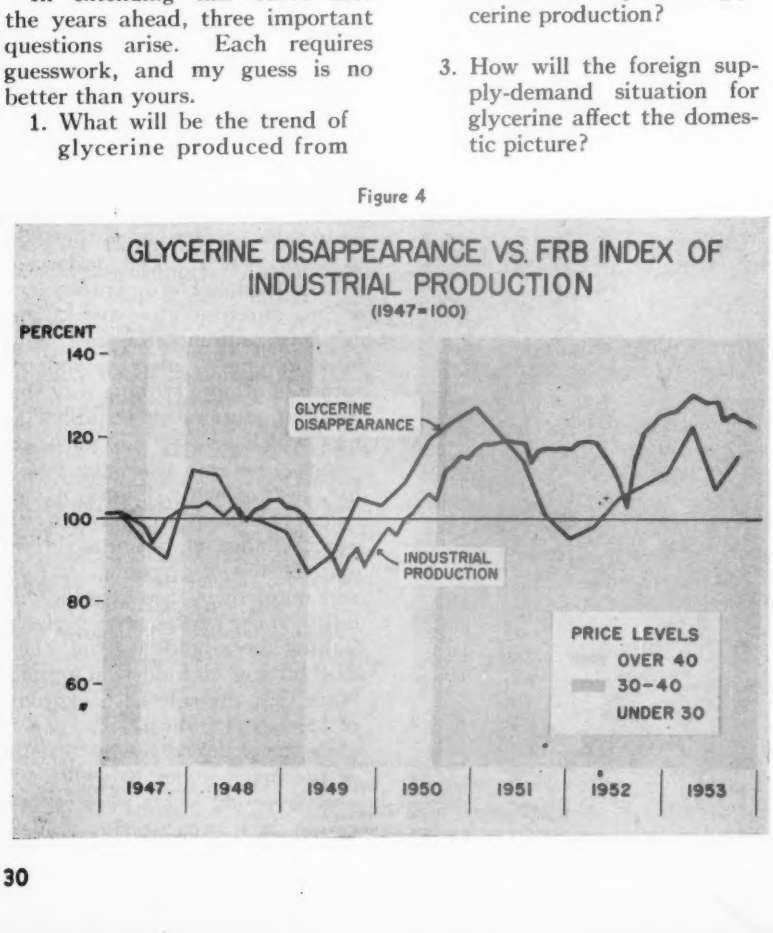
In extending this curve into the years ahead, three important questions arise. Each requires guesswork, and my guess is no better than yours.

1. What will be the trend of glycerine produced from fats, in the light of soap and fat-based detergents versus petroleum-based synthetic detergents?

2. What will be the extent and effect of synthetic glycerine production?

3. How will the foreign supply-demand situation for glycerine affect the domestic picture?

Figure 4



A decline in soap production over the next three or four years, equal to that of the past few years, would bring domestic glycerine from this source well below 100 million pounds. This, of course, ignores glycerine from industrial fat-splitting and fat-derived detergents. There is evidence of continuing offsetting growth here. Tallow acids are being modified and split down the middle to enter big-volume fields of plasticizers, synthetic fibers and lubricants. New fatty alcohol capacity is being installed. It is difficult to see glycerine from fats declining below 125 million pounds a year in any case. 150 million makes sense for 1954.

If we add to this synthetic glycerine production now operating, building or announced, we can foresee a domestic supply of 250 to 275 million pounds some three or four years hence. Assuming a steady availability level that will discourage substitution in the meantime, this ought not to be excessive for a growing country.

Of course, it is not too many years ago that we were frequently a glycerine exporting nation. This could logically happen again. Certainly, the high levels of importation chalked up in 1953 seem unlikely to be repeated. Already, glycerine demand elsewhere in the world is leading some foreign buyers to outbid American producers. Foreign crude will find a market elsewhere, I suspect, if its price, plus the refining differential, is limited, here in America, to the level at which synthetic glycerine can be produced and sold.

But, to plan on exporting glycerine, rather than to plan on expanding glycerine markets here, ignores unexploited product qualities and potentials. The present cost of application research on glycerine, of sales cost on glycerine and advertising cost on glycerine is far less than the average level for chemicals as a group. Chemical companies average 2.5 percent of sales on research, of which a large part is directly or indirectly to widen markets.

Glycerine, as a 75 million dollar business, could be spending a

(*Turn to page 67*)

COMPATIBILITY OF POLYMERIC MATERIALS

By WALTER J. HANAU

The object of this article will be the discussion of various phases of the problem of blending several polymeric materials. The formulator of surface coatings has a choice of a limited number of industrial polymeric products, which must be modified in each application to produce the particular properties desired. For many uses, it is desirable to blend several resins, together with other modifiers. Due to the endless possibilities of combinations to be tested, a simplification of the rules governing mutual compatibility would be highly desirable.

THE PRESENT study will deal, with some of the facts encountered in working with polymer blends, and the procedures for establishing these in the case of any particular combination of polymers. This will include a discussion of the requirements of workable blends, some of the troubles encountered, and tests to determine the extent of compatibility.

The extent of incompatibility which can be tolerated varies from one application to the other, as we shall discuss later. Both time and mechanical factors enter into the picture. A fully useful system of evaluation should supply information on the extent of incompatibility to be expected.

Industrial Importance

The production of polymeric materials involves such close control of conditions that in most cases only a very large-scale operation can economically produce material of satisfactory homogeneity (within each sample) and reproducibility (from batch to batch). As a result, the formulator must achieve his results through the use of a limited, though constantly increasing, number of commercial polymers. When special properties must be obtained, the use of "custom-tailored" resins is often economically unfeasible because of the high cost compared to standard products. In these cases, the blending of several commercial polymers frequently produces the desired effect. The following discussion will aim particularly at solvent-based compositions used for coatings, but to some extent the principles will apply also to compositions for molding, extrusion, etc.

The following example will illustrate some of the modifications possible. A copolymer of vinyl chloride and vinyl acetate may be modified in any of the following ways, while wholly or partly maintaining its main advantages of toughness and chemical resistance. Flexibility is increased by monomeric or polymeric plasticizers. The latter, desirable because of their permanence, include nitrile rubbers and non-phthalic alkyd resins. In addition to their plasticizing action, nitrile rubbers provide vulcanizability, and certain alkyds greatly improve the heat and light stability of the mix Addition of amino resins (urea or melamine formaldehyde types) produces thermosetting vinyl coatings of greatly improved resistance to chemicals, solvents, heat, and abrasion. A tri-polymer containing a maleic acid-type monomer may be added to improve the metal adhesion of the base resin. A small amount of either ethyl cellulose or certain high-melting waxes combats surface tackiness of the coatings at high temperatures. Certain low-melting resins may be added to produce a narrower melting range for heat-sealable coatings, which must fuse readily at moderately high temperatures without showing any tendency toward tackiness at normal storage temperature. Finally, a special copolymer may be combined with cellulose nitrate, to take advantage of the hardness and quick drying of the latter. Similar examples could be cited to show possibilities for modifying other polymeric materials, greatly extending the range of properties attainable from any one resin.

Compatibility Requirements

Generally speaking, the components of a mixed resin solution must be mutually compatible to such an extent that both liquid consistency and dry film integrity are satisfactory. The exact degree of each of these requirements will vary with the application. Thus, a

solution mixed for internal factory use, as needed on the machine, may be perfectly satisfactory even if the liquid is stable for a few hours or less; materials to be sold ready-mixed, on the other hand, may require liquid stability over a period of months or years. The dry film compatibility requirement varies from a minimum required for a continuous film to be formed, to applications where a maximum of mechanical strength, film clarity and gloss is needed. As a rule, a semi-compatible system (one showing only limited clarity either in the liquid mixture or in the dry film) should be used only after thorough testing under actual use conditions because of their inherent instability.

Types of Incompatibility

The compatibility of a liquid system depends on the chemical composition, molecular weight and linear symmetry of the polymers used, on their relative proportions and total concentration in the solution, and on the solvent composition. The effect of these factors will be discussed in greater detail subsequently.

Incompatibility of the liquid system, in the strongest form, produces nearly solid gel precipitation; if the amount of incompatible material is large, this precipitate may almost completely entrain the remaining liquid phase. A milder form of liquid-phase incompatibility produces opacity; such opaque "solutions" generally separate on standing into a liquid phase and a gel phase. The gel phase in this case is generally rather fluid and accounts for only a small portion of the total volume; it may settle or float, depending on the density of the incompatible component. Some systems of this type, exhibiting moderate cloudiness and separation times of several days or weeks, are quite practical for many applications. The mildest form of liquid incompatibility consists of a gradual clouding up of the solution when at rest, and clearing upon agitation. These solutions often clear completely on further dilution, and should offer no trouble except in cases where long-time stability is required.

Incompatibility in the dried film ranges from slight loss of gloss and/or clarity, to extreme cases where the film integrity and strength is destroyed; such films may be short and brittle or waxy-soft, depending on their inherent hardness. This type of incompatibility may be caused either by actual lack of mutual solubility of the non-volatile components (resins, plasticizers, etc.) or by an unbalanced solvent mixture. In the latter case, the volatile components evaporate in such a way that a non-solvent for one of the resins remains, causing its precipitation. This latter type may generally be cured by adjusting the solvent so that its various classes of components (alcohols, ketones, aromatics, aliphatics) remain at a reasonably constant proportion as drying proceeds. The more fundamental resin incompatibility mentioned above can be alleviated, if at all, only by inclusion of a mutual non-volatile solvent, or by change in the relative amounts of the offending components.

Incompatibility in solution and in the dry film need not occur together; a mild form of liquid incompatibility may yield a reasonably integral dry film, and vice versa. In some cases, a compatible solution has been observed to yield a clear, air-drying film, from which precipitation occurred on hearing. Apparently, a tendency toward separation in the dry film existed, which manifested itself when the internal mobility was increased by heating. Incompatible components of the dried film—especially non-polymeric ones such as plasticizers or soluble dyestuffs—may also be exuded from the film upon aging, especially under the influence of ultraviolet radiation.

Tests for Compatibility

While compatibility evaluations of coating resin solutions will vary with the projected use and requirements, certain general procedures should prove useful.

It is recommended that the first evaluation of both liquid and dry-film compatibility be made in the clear, i.e. without the addition of any pigmenting materials. In this way, any incompatibility can be more easily identified as to type and degree, without having its effects obscured by the presence of opaque pigment particles. If pigmented and unpigmented liquids are to be mixed in the final formula, incipient gelling of the former must be especially guarded against because of the danger of pigment flocculation and consequent loss of gloss and color value. This type of formula should first be tested by mixing the components exactly as intended in the final formula, but substituting the clear resin solution for the pigmented liquid. The various components should be mixed in the order which will minimize local precipitation. The clarity of the final solution is the best immediate indication of liquid stability; ordinarily, a layer of liquid several inches thick should show no haziness. An exception is the case of certain resins (some vinyl copolymers and others) which yield cloudy solutions by themselves, possibly due to the presence of a small amount of high molecular weight "Tails" in the polymer. In these cases, the cloudiness of the resin solution should be taken into account in evaluating the final cloudiness of the mixed solution. Especially in the case of doubtful solution clarity, the stability of the solution on standing should be checked regarding gelling and/or separation; the time of this test will depend on the required period of solution stability.

For an evaluation of compatibility during and after drying, the liquid should be applied by suitable means to a transparent or specularly reflecting surface. This offers the easiest means of noticing any lack of gloss or clarity which may develop during drying. Brushed, sprayed or flowed-on coatings may be applied to a glass or polished metal plate. If thin coatings are to be laid down by a hand gravure unit (resulting in exactly metered wet thickness), brightly finished aluminum foil, backed by a resilient pressure pad, is a convenient base. In each case, the method of film application and drying should be governed by the intended use. After drying, and after any aging tests considered necessary (e.g. heating, ultraviolet radiation, exposure to water or chemicals) the film should be examined for gloss, clarity, strength, and exudation. The latter, especially in the case of plasticizers and other oily mater-

ial is best checked by feel and by rubbing with clean filter paper or similar material (to show "grease spots"). Film integrity may be conveniently inspected by stripping a piece of pressure-sensitive cellophane tape over the film. Films adherent to the substrate may break if deficient in integrity, leaving a coating both on the substrate and the tape. With non-adherent films, the free film stripped off beyond the edges of the tape will often provide a good check of its toughness by "feel". With non-adherent films, it may be advisable to check for oily exudation at the interface between substrate and coating.

It should be emphasized that the above tests of the clear coatings are only the first phase of evaluation of a pigmented formulation. The chemical compatibility between pigments and vehicle components must be checked in each case; in addition, plasticizer absorption by the pigment may materially alter the behavior of the system. However, we feel that a compatible combination of resins, plasticizers and solvents will greatly simplify the formulation of a satisfactory pigmented coating.

Factors Governing Compatibility

While no definite rules of compatibility can be formulated from the data and correlations available at this time, certain trends in the behavior of resin mixtures are useful as general guides, enabling an "educated guess" in many cases.

Given a polymer of fixed chemical composition and structure, a lower molecular weight (shorter chain length) will generally result in wider compatibility. The chances of two polymers being compatible are greatest when the resins are of similar polarity. However, because of molecular complexity, the latter consideration can serve only as a rough guide. The manufacturers of most commercial resins publish tabulated compatibility data, covering the proportions in which the polymer is compatible with each of a number of other resins, plasticizers, etc. From these data, it is apparent that small changes in the composition of a polymer (e.g. by copolymerization) often have a striking effect on the compatibility behavior. To complicate the picture further, two resins may exhibit similar compatibility toward a wide range of materials, but differ in their behavior toward certain classes of polymers. Compatibility between two polymers definitely cannot be predicted merely on the basis of each one being compatible with a (common) third polymer.

A partial explanation of the apparent discrepancies mentioned above will be found in the factors of molecular symmetry (presence or absence of bulky side chains), flexibility of the macro-molecule, and spacing of side groups of various types of polarity. These are the same factors which control ease of crystallization; thus, in many cases, polymers of high crystallizing tendencies show limited solubility and compatibility.

While the available data permit more negative than positive generalizations regarding correlation, the following may be suggested for the estimation of probable compatibility between two polymers: Chances for compatibility are good if one or both are of medium or low molecular weight; if they are of similar polarity (as indicated by solubility in similar solvents); if neither of the resins possesses a structure indicative of excessive crystallinity or chain stiffness. As examples of the last factor we mention certain cellulosics; thus, cellulose nitrate shows incompatibility even between otherwise identical grades of different molecular weight; cellulose acetate shows extremely limited compatibility, compared with other, more flexible resin chains of similar polarity.

The above discussion, of course, applies only in the case of a well balanced solvent; i.e. the volatile portion of the formulation must be a good solvent for each of the polymeric components. An example of this point would be a co-solution of nitrocellulose and any one of a number of resins requiring aromatic hydrocarbons as co-solvents; in this case, an excess of alcohol would precipitate the resin, while an excess of hydrocarbon diluent precipitates the nitrocellulose. In a balanced solvent mixture, such co-solutions are definitely compatible.

Specific interaction between certain solvent and solute groups is shown by the effectiveness of mixed solvents in the case of many polymers, thus, some resins (e.g. polyamides made from dimerized fatty acids), for which no single "pure" solvent shows satisfactory performance, dissolve with relative ease in a mixture of solvents (alcohol plus aromatic hydrocarbon, for the above example). Generally, therefore, the drying process should be controlled by properly balanced solvents, assuring sufficiently constant ratios of various polarities during the process of drying.

As a rough guide to the amounts of one resin compatible with another, in cases where compatibility does not extend to all proportions, there appears to be the following tendency: A small portion of a more easily dispersible polymer often yields compatible liquids and films with a preponderance of a polymer of limited compatibility characteristics; a small amount of the latter, on the other hand, would tend to separate out of a mix in which a more easily soluble resin forms the bulk of the non-volatile matter. Thus, certain acrylonitrile-vinylidene chloride copolymers, showing quite limited compatibility, will tolerate small amounts of various modifiers. Similarly nitrocellulose grades of high and low molecular weight may be blended successfully, if a preponderance of the high molecular weight material is used; separation phenomena occur, however, when a small amount of high molecular weight nitrocellulose is mixed with a large amount of a low molecular weight grade. Undoubtedly, large inter-molecular attractive forces in the case of many of these difficulty dispersible polymers play a part in their tendency to separate out of any solution in which they constitute only a small portion of the total. In some cases, this feature of tolerating small amounts of otherwise incompatible additives suffices to permit valuable modifications of the properties of polymers of limited compatibility.

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News of Paint and Varnish Production Club Meetings

New York

"Moisture Resistance of Paint Films" was the topic of a paper presented by Edward J. Dunn, Jr. at the February 4th meeting held at the Brass Rail in New York City.

W. E. Santoro, President introduced several honored guests, Mr. Stewart, Vice President of the National Lead Co., C. H. Baier, of National Lead Co. Research Laboratories, who conducted most of the work presented in the evenings talk, and Mr. Joh Kosters of the N. V. Vernis Van Klaveren, En Zonen, Rotterdam, Holland.

According to Mr. Dunn, head of the Physical Measurements Department of the National Lead Research Laboratories, it is known that most cases of unsatisfactory performance of exterior house paints can be traced to the accumulation of water in back of the paint film. When water saturates the wood in back of the film, it eventually destroys the adhesion or bond of the film to the substrate. Blistering of paint films is evidently one of the basic troubles as noted by the large number of such cases reported.

There is little doubt that water is one of the more damaging elements to building structures. Similarly, water appears to be one of the larger factors in the deterioration of paint films. Water causes paint films to swell, soften and become distorted. Paint films may absorb enough water to expand the film volume up to a 50% increase over its original size which materially reduces its adhesive and cohesive bonds.

Mr. Dunn used slides to picture and illustrate how water permeability, water sorption, water solubility, osmosis, swelling of the wood in two directions, thermal expansion and water sorption of the individual components of the paint film are but some of the factors involved. Charts also illustrated the effects of these factors in turn on the physical properties of the paint film such as adhesion, tensile strength elongation, softness or hardness of the film readily show the tremendous number of phenomena that have to be considered in any analysis of the moisture resistance of paint films.

The next meeting was held on March 4, Speaker of the evening was Harry W. Howard of the Shell Chemical Company, who presented a paper on "The Use of Epon Resins in Surface Coatings". It included a discussion of este formulations versus alkyds and their behavior in the presence of various chemical reagents.

Exposure panels showing the effects of weatherometer and ultraviolet light were displayed and flexibility and impact resistance were demonstrated.

In addition the Epon resin converted systems covering the urea and phenol formaldehyde Epon resin compositions were covered and a comparison made with the phenolic baking solutions currently in use. A third system covered in Mr. Howard's talk, the Epon resin amine cured, was compared to the polyamide picture. Chemical resistance of each were demonstrated and formulation principles outlined. An end use pattern for all types of Epon coatings has been worked out as an aid to the paint formulator.

The Technical Committee of the New York Paint and Varnish Production Club held its monthly meeting at the Brass Rail on January 21st.

A number of sub-committee chairmen presented reports of their results to date:

Advisory Committee: S. R. Mountsier reported that this group has decided on three objectives:

1. To assimilate ideas from industry and report on those of greatest interest to the Technical Committee for the initiation of new projects.
2. To review papers related to our industry and invite the authors to discuss items of interest that might be further investigated by the Technical Committee.
3. To aid slow moving committees in laying out future work.

Film Thickness: R. J. Phair and Maynard R. Euverard discussed the various types of gages, which might be used for measuring dry film thickness in the field. A modification of the Gardner Gage appears to be the best to date. Contact will be maintained with the A.S.T.M. committee which is working on a similar project.

Emulsion Paints: Julius E. Spector reported that the committee is developing a more reliable Test for stain removal.

Interior Substrates: Sidney B. Levinson advised that his group has simplified its procedure for testing Spackle and is in the process of developing a uniform technique for applying the Spackle during the tests.

Pigment Dispersion: Raymond L. Whitney reviewed the work to date covering the mixing and roller milling of Toluidine Red.

Dielectric Strength: Frederick H. Damitz reported that there appears too little interest in this subject to reactivate this committee.

Flat Wall Paints: George Selesky presented a summary of the scrub resistance tests developed by his group.

Drying Time: Stanley Richardson advised the committee that the final report on Tack Free Time should be ready by the middle of March.

Two new committees have been formed and interested parties are invited to contact their chairman.

Literature and Discussion, George Cook, Chairman.

The Effect of Ultra Violet Light on Lacquer Films, Royal A. Brown, Chairman.

This is the first time in 15 years that the New York Club has formed a committee to study lacquers. The move is a prelude to further studies in the field of Industrial Product Finishes.

The Technical Committee held its February meeting at the Brass Rail on the 18th.

The following subcommittee chairmen presented reports on the recent meetings of their groups:

Flat Wall Paints, George Selesky; Study of Pigment Dispersion, Raymond L. Whitney; Emulsion Paints, Julius E. Spector; Color Matching in Production, S. Leonard Davidson.

The main event of the evening was a discussion of "Complaints and Their Handling" by Carl Engelhardt of Brooklyn Varnish Corp.

Chicago

The Chicago Paint and Varnish Club played host to the officers of the Federation of Paint and Varnish Production Clubs at its meeting February 8.

Speaker of the evening was Dr. Burley Gardner, lecturer, author, industrialist, who will discuss human relations in industry. Dr. Gardner is Executive Director of Social Research, Inc., a firm devoted to consultations with management in the field of human relations.

Speaker for the January 18 meeting was Arnold Eickhoff, of the National Lead Company, who discussed "New Amine Bentonites for Use in Protective Coating Compositions." In his discussion Mr. Eickhoff told of the development of a new Bentone material, particularly applicable to lacquer and vinyl systems. This new material is now available.

The next meeting was held March 1, at the Furniture Club, 666 Lake Shore Drive.

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NEWS DIGEST

Chemical Institute of Canada Schedules Annual Meeting in June

Presentation of the 1954 Chemical Institute of Canada Medal and the address of the Medallist, will be among the features of the 37th Annual Conference and Exhibition of the Institute scheduled June 21-23, in Toronto.

The medal is awarded to the individual who has made an outstanding contribution to chemistry or chemical engineering in Canada.

Other special events will include the exhibition of chemicals and equipment, the Westman Memorial Lecture, plant tours and a golf tournament.

About 1,200 industrialists, engineers and scientists are expected to attend the conference which will include presentation of 100 papers covering such fields as protective coatings, chemical engineering, and organical and physical chemistry.

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Soybean Association Approves Government's 1954 Party Plan

The government's announcement that it will support this year's soybean crop at 80 per cent of parity will meet with the general approval of soybean growers, if there are no controls on the 1954 crop, and if the 1954 soybean acreage is not used in fixing any future acreage allotments, Geo. M. Strayer, President of the American Soybean Association, said recently.

Mr. Strayer said the Soybean Association has asked Secretary of Agriculture Benson for a support price based on 80 to 85 per cent of parity after sounding out producers in local grass root meetings in Ohio, Indiana, Illinois and Arkansas last fall.

•

Wayne University Offers Course On Evaluation of Organic Coatings

A laboratory course on Evaluation of Organic Coatings is being offered by the Department of Chemical Engineering, Wayne University, Detroit, and sponsored by the Detroit Paint and Varnish Production Club and the Detroit Paint, Varnish and Lacquer Association.

The course, which began February 12, will run through June 11. It consists of 16 three-hour sessions on Thursday evenings, 7 to 10 p.m.

The course is a continuation of Chemical Engineering 215, Surface Coating Technology 1, given at Wayne University in the Fall semester.

Mayor Robert F. Wagner of New York, left, congratulates E. S. Phillips, Chairman of the Board of Devoe & Raynolds Company, Inc., New York City's oldest manufacturing firm, on the 200th anniversary celebration of Devoe's founding. The mayor assured Mr. Phillips that his administration is making a special effort to keep large firms from moving out of the city. Devoe & Raynolds was founded in Manhattan in 1754.

Devoe & Raynolds Holds Banquet To Celebrate Its 200th Anniversary

The Devoe & Raynolds Co., Inc., celebrated its 200th anniversary February 11, at a banquet held in the Roosevelt Hotel in New Orleans, La.

President W. C. Dabney and Chairman of the Board W. S. Phillips told the company's salesman, gathered in New Orleans for a regional meeting, that the opening of the third century of the company's existence, marked a new era of expansion and vitality for Devoe & Raynolds.

Karl Scheidau, New Orleans branch manager, was present along with other local Devoe representatives and salesmen from 12 states, from Virginia to Texas.

At the annual sales meeting held prior to the banquet, J. Harold Kolseth, Vice President in charge of All Trade Sales Divisions, said that the paint industry this year expects to surpass last year's record-breaking sales volume.

The company's belief that sales in 1954 will surpass last year, Mr. Kolseth explained, is based on the 7 million unit increase in houses since the war, and the expectation that housing starts this year will come to one million.

These new homes, which bring to 50 million the total of dwelling units now in use, provide an expanding market for both outside and interior decorating purposes, Mr. Kolseth said.

Koppers Company To Construct Polyethylene Production Facilities

The Koppers Company, Inc., Pittsburgh, has announced plans for the production of polyethylene.

Several plant sites are being considered, including Port Arthur, Texas, the company said.

Final decision on the location of the new chemical plant is expected shortly.

Actual construction will start this Spring and operation is scheduled for the middle of 1955.

Four major production areas will make up the plant. Much of the equipment to be installed is of the "outdoor type." In addition to the major processing buildings, office, laboratory and service facilities will be provided.

First Paint-Type Product Carload Shipped from West to East Coast

The first carload of a canned paint-type product ever shipped from the West Coast to the East Coast was made last month when Olympic Stained Products Company of Seattle, Wash., shipped a carload of Olympic Stain to the Long Island Reserve Company, Mineola, N. Y., Olympic distributor in the greater New York area.

Hundreds of thousands of gallons of paints have been shipped from the East Coast to the Western States, but this reversal of shipping marks the beginning of a trend, according to Burr Odell, sales manager of Olympic.

He predicted the trend on the basis of increased use of stain.

Adjustment Good for Business, Commercial Solvents Pres. Says

American business has every reason to face the future with confidence, J. Albert Woods, President of the Commercial Solvents Corporation, New York, N. Y. said recently.

Speaking before the Rotary Club of Terre Haute, Ind., on "The Hands That Hold Our Future," Mr. Woods expressed the view that "what American business faces in 1954 is no more than an adjustment to a new set of conditions brought on by the cessation of Korean hostilities, reduced defense expenditures and post war demand and supply becoming balanced in a number of business fields."

He said, "there were two all-important forces for the continued growth of business in this country. The first is people, in ever-expanding numbers. The second is scientific research which will provide our rapidly growing population, not merely with the necessities of life, but with the aids for everyday living which frees men from the endless toil to stay alive."

Mr. Wood then went on to say that there was nothing in the country's recorded history to substantiate the idea that we had "wasted" or "were exhausting" our natural resources and there was much to discredit it.

"Each successive era in the history of man has led him to utilize raw materials he had never been able to use before. And long before he used up the resources for which his age was named, he moved on to new ones."

He added that 1953 had been a prosperous year for the United States with 365 billion dollars worth of goods and services produced, the largest total national product in the history of any nation.

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Cowles Co. Labs. Available for Dissolving Engineering Problems

The Cowles Company, Inc., will accept a limited number of dissolving engineering problems for research in their Cayuga, N. Y., laboratories, Horton Meyer, Cowles Vice President, announced recently.

Goal of the project is to extend the use of ultrafast dissolving machinery into new fields of dissolving and dispersing chemistry., he said.

Mr. Meyer added that a large file of material had already been assembled and collated.

Steel Shipping Container Inst. Holds Winter Meeting in New York

New packages, particularly in the heavy drum classification, can be developed during the current year was the feeling expressed at the Winter Meeting of the Steel Shipping Container Institute, Inc., New York, N. Y., held January 20-21, with committee meetings at the Hotel Pierre and the Board of Directors meetings at the Hampshire House, in New York.

Both the Board of Directors and committee meetings were concerned with the continued research for improved line containers and improved methods of construction.

At the Board of Directors meeting, Anthony Giammanco, President of Central Can Company, Inc., Chicago, was elected a director to fill the vacancy caused by the resignation of O. S. Witherell, retired.

Discussing the business trend in the steel container field, most of the industry members expressed the opinion that volume sales for the first quarter of 1954 will compare favorably with the fourth quarter of 1953.

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Process Equipment Firm Opens New Quarters in Elizabeth, N. J.

Process Engineering and Machine Co., has announced the opening of a factory and offices in Elizabeth, N. J.

The firm will manufacture, on either designed or fabricated basis, process equipment and plants such as condensers, columns, heat exchangers, mixers, tanks, alkyd, and phenolic and urea and furfural-formaldehyde resin plants.

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Corrosion-Resistant Materials To Be Covered at Chicago Conference

Conference discussions on the use of materials which combat erosion and corrosion, and adhesives and adhesive bonding of metals and plastics, will be among the highlights of the Basic Materials Conference scheduled May 17-20, in Chicago.

The conference will be held concurrently with the Basic Materials Exposition at the International Amphitheatre, Chicago. T. C. DuMond, editor, "Materials & Methods," will be the conference chairman.

The meeting will open with a review of new developments in basic materials during the past year.

The Exposition will feature scores of displays, on the thousands of new materials now available to manufacturers.

A group of 14 industrialists is serving as a board of sponsors for the exposition. Don G. Mitchell, Chairman of the Board, Sylvania Electric Products, Inc., New York, is chairman of the sponsoring group.

Burr Odell, right, sales manager of Olympic Stained Products Company of Seattle., Wash., looks on as Philip W. Bailey, left, President of the Company, tells Rear Admiral Gordon Rowe, chairman of the Seattle Port Commission of the significance of the largest shipment of canned paint-type product ever to move from the West Coast to the East

•

Reichhold Chemicals, Inc. Sells $1,100,000 of Preferred Stock

Reichhold Chemicals, Inc., New York, has privately sold $1,100,000 of 4-½ per cent preferred stock, Henry H. Reichhold, Chairman of the Board, announced recently.

This move brings the total amount of outstanding stock to $2,000,000. The new financing, together with the retention of earnings, has brought the company's working capital to a new high, Mr. Reichhold said.

The new funds will provide for additional plant expansion at Reichhold's Tuscaloosa, Ala., and Ballardvale, Mass., plants, and will largely be invested in facilities for the production of formaldehyde and pentaerythritol.

•

Paint, Varnish & Lacquer Assoc. Receives National Guard Award

For distinguished service to the National Guard, the National Paint, Varnish and Lacquer Association has been presented with the National Guard Meritorious Services Plaque.

The presentation was made to General Joseph F. Battley, U. S. Army, Retired, President of the Association, by Major General Edgar C. Erickson, Chief of the National Guard Bureau, in an informal ceremony in General Erickson's office at the Pentagon.

•

Vulcan Containers Ltd. Begins Production of Printing Inks Cans

Tin cans, designed for the shipping of printing inks, are now being manufactured and stocked in Toronto for Canadian ink manufacturers by Vulcan Containers Ltd.

Operations are being carried out at the firm's new plant located on a 5 acre tract in the Rexdale area of Northwest Toronto.

Painting & Decorating Contractors Hold 1954 Convention Feb. 23-26

A panel discussion on "The Challenge of the Do It Yourself Movement" was among the features of the 1954 National Convention of the Painting & Decorating Contractors of America held February 23-26, Hotel Statler, Los Angeles.

Other events at the meeting, attended by more than 500 industry members, were manufacturers exhibits, a display of decorative panels entered in competition for cash awards by apprentices and journeymen throughout the country, and talks on the latest developments in rubber and latex base paints, and odorless paints.

Executive Secretary of the PDCA, George S. Stuart, said "current trends indicate 1954 will be a good business year, with much public work, a great deal of institutional work such as school buildings, and a large amount of government work."

He added that the slogan, "Relax! Let An Expert Do It, is expected to become the battle cry of the contractors during this year to offset the current "Do It Yourself" trend.

•

Glidden Company Expands Naval Stores Production Facilities

Installation of additional chemical production equipment at the Glidden Company's Naval Stores Division plants at Jacksonville, Fla., and Valdosta, Ga., and plans for still further expansion of these facilities were announced recently by Paul E. Sprague, Glidden Vice President.

The present addition and the projected further expansion call for an investment of close to $500,000, Mr. Sprague said.

He added that the newly completed facilities at the firm's Jacksonville's plant would help meet increasing industrial demands for terpene chemicals, particularly synthetic pine oil and synthetic DL-limonene.

The Valdosta plant produces rosin-based and other synthetic resins and related products.

•

Woburn Appoints New York Agent for Its Line of Fatty Acids

The Woburn Chemical Corporation of Harrison, N. J., has named the T. F. Gowdy Company of New York, N. Y., as exclusive representative for its line of fatty acids and isoline within the fifth mile radius of New York City except for Long Island.

Charles Gardner

Advance Solvents Executive Named To American Arbitration Assoc.

Charles Gardner, Eastern Sales Manager of Advance Solvents & Chemical Corporation, has been appointed a member of the National Panel of the American Arbitration Association.

The American Arbitration Association is a national organization established for the purpose of advancing the knowledge and use of voluntary arbitration. It is a privately organized and financed institution of scientific and educational nature, and is non-partisan, non-political and non-profit-making.

Members of the National Panels are chosen from a wide range of professions and trades including nearly occupational group.

The Association also functions through cooperative arrangements with foreign agencies in the 22 countries of the Western Hemisphere and in Europe, Asia, Africa and Australia.

•

Dr. C. J. Overmyer, Federation President, Plans Trip To England

Dr. Calvin J. Overmyer, President of the Federation of Paint and Varnish Production Clubs will visit England early this month.

The announcement of his trip was made at a meeting of the Federation's Board of Directors held in Dallas, Tex., on February 13.

The occasion for Dr. Overmyer's visit will be the 25th anniversary of the founding of the Birmingham Paint, Varnish & Lacquer Club, one of the 24 Constituent Clubs of the Federation.

While in England, he will also attend some of the functions of the Oil & Colour Chemists' Association, one of the three organizations comprising the Tri-Alliance. The other two are the Federation and FATIPEC.

Dr. Overmyer has also made plans to visit his alma mater, Oxford University where he was a Rhodes Scholar at Oriel College, and the first American to receive the degree of Doctor of Philosophy in Chemistry.

Bill Proposed To Forbid Sale of Paints & Enamels Containing Lead

An act to amend New York State penal law in relation to the sale of paints and enamels within the state has been introduced in the Senate of New York State.

Proposed by Senator Zatetzki, Senate Bill No. 1821 provides:

Section 1. The penal law is hereby amended by inserting therein a new section to be section 433, to read as follows:

Section 433. Sale of paints and enamels. After January 1, 1955, no person shall sell, offer or expose for sale within this state any paint or enamel containing lead as one of its ingredients or components, and no person, firm, association or corporation shall send into this state for purposes of resale within the state any paint or enamel containing lead as one of its ingredients or components, unless the can, pail or other container bears a label containing a statement that one of the ingredients and components of such paint or enamel is lead, and a warning that the contents of such containers are poisonous.

Section 2. This act shall take effect immediately.

In a telegram to John H. Hughes, Chairman of the New York Senate Committee on Codes, Frank R. Pitt, Chairman of the Legislative Committee of the National Paint, Varnish and Lacquer Association, stated:

"On behalf of the manufacturers and dealers in paint products I wish to express opposition to Senate Bill 1821 as an ill-conceived measure that has little relevancy in promoting the public health and welfare;

"Few paints today contain lead, except in insignificant quantities as a drying agent yet such measure would require all such paints to be labeled poisonous, which statement is at variance with the Fact;

"The arbitrary and false labeling of a necessary and useful commodity as being poisonous imposes an unreasonable hardship by serving as a substantial deterrent to use of such commodity."

•

Two Sales Agents Appointed To Handle Glidden Naval Stores

E. W. Colledge, G.S.A., Inc., Jacksonville, Fla., exclusive sales agents for the Glidden Company's Naval Stores Division, has appointed two firms to handle Glidden naval stores manufactured by the Division's plants in Florida and Georgia, and by the American Turpentine and Tar Company of New Orleans.

The firms are the O. Hommell Company of Pittsburgh, and the B. H. Roettker Company of Cincinnati.

Ultramarine Blue Discussed at New York Pigment Club Meeting

Laboratory experiments and pilot plant production of an ultramarine blue with from 60 to 100% higher tinting strength, and which is softer and less abrasive than commercial grades, was described by Charles A. Kumins, Interchemical Corp., The Research Laboratories, New York, at a meeting of the New York Pigment Club, February 10. Manufacture of the new color, the speaker stated, requires less than one day compared with the present 10 to 14 days.

The basis of the new development is the techniques worked out to get the sulfur combined as a higher polysulfide than is believed to exist in normal commercial practice, the speaker explained. The conversion form the primary to secondary ultra-marine blue is accomplished by the removal of sodium oxide from the crystal lattice.

In leading up to the new development, the speaker traced the history of ultramarine blue, during the course of which he pointed out that it was first synthesized in France in the early 1800's, and that present consumption in the United States is about 19,000,000 pounds of which 17,000,000 is of domestic origin. Most of it, he said, is used in printing inks, wallpaper, mixing whites, distempers, and roofing granules.

Comparing ultramarine blue with its nearest competitors, phthalocyanine blue and iron blue, Mr. Kumins, by drawdowns and spectrophotometric analyses, enummerated its advantages and disadvantages. With X-ray analyses, he showed the physical structure of the pigment, basically a tetraheydron, and explained its theoretical molecular structure.

Turning to actual manufacture, the speaker discussed the raw materials used and the processing steps employed including calcining, grinding, and levigation operations. He pointed out that commercial manufacture of ultramarine blue was an exacting combination of an art and science.

In conclusion, Mr. Kumins mentioned several recent patents relating to the pigment, reporting in particular on recently developed acid resistant types. He also mentioned several general attempts to develop a commercial ultramarine red.

At the business meeting which preceded Mr. Kumin's talk, Aaron Permut, Aula Chemicals, Inc., Elizabeth, N. J., and president of the New York Pigment Club, outlined plans for enlarging the Program Committee from three to seven or eight members and discussed the possibility of holding a social function later in the year.

The next meeting will be held at Fraunces Tavern on March 11, 1954. Dr. Kurt Stern of the Brooklyn Polytechnic Institute will speak on "Naturally-Occurring Pigmented Materials."

•

Koppers To Assist in Construction Of Styrene Monomer Plant in France

Koppers Company, Inc., Pittsburgh, has received a contract to furnish engineering services and field assistance in the building and operation of a new styrene monomer plant in France, the first of its kind in that country, it was announced recently.

B. J. C. van der Hoeven, Vice President and Asst. General Mgr. of Koppers Chemical Division, said that the plant is to be erected at Mazingarbe, France, for the Societe Houilleres-Pechiney-Progil, a chemical corporation owned jointly by Houilleres du Nord et du Pas-de-Calais, a nationalized firm which operates extensive coal, coke and chemical facilities, and Pechiney and La Societe Progil, companies now producing chemicals in France.

Construction of the French plant is expected to take at least two years. It will have a rated capacity of from 10,000 to 14,000 metric tons per year.

Vehicle Manufacturers

The next regular meeting of the Vehicle Manufacturers' Group (New York Paint, Varnish, and Lacquer Association) will be held April 14, at the Chemists' Club, 52 East 41st St., New York, N. Y., according to a joint announcement by Benjamin Farber, chairman, and Oscar Mueller, vice chairman, of the Group.

A technical representative of the Monsanto Chemical Company will speak on styrenation.

Newport Industries, Inc., New York 17, N. Y., held its Annual Sales Meeting February 1, in Pensacola, Fla. Some of the meetings were held with the production and research men so that the Sales Department could be brought up to date on current and future projects.

Canco To Construct Research Center in Barrington, Ill.

The American Can Company has begun construction on a new research and development center located on a 40-acre tract of land in Barrington, Ill.

Dr. Robert Warren Pilcher, Canco Director of Research, will head the new Barrington laboratory.

The building will be shaped like a capital "I" and will contain about 102,000 square feet of floor space, with provisions for a later expansion to 140,000 square feet.

It will be a one-story structure except for a small section of the central part of the building which will be two stories.

More than 150 scientific, technical, clerical and maintenance personnel will be housed in the new structure which will have special laboratories devoted to food chemistry, tinplate, coatings and other specialized types of research.

Special "hot" and "cold" rooms, capable of simulating climate conditions from the Tropics to the Arctic, will permit storage of test packs of every type of food and non-food products, according to Dr. Roger H. Lueck, Canco's General Manager in Charge of Research and Development.

He said the building and equipping of the new research center will require an estimated 12 months to complete.

In addition to the new facilities, Canco will continue its technical service and quality control groups at Maywood, Ill., Dr. Lueck stated.

•

Methyl Cyclohexanone Available From Baird Chemical Corp.

The Baird Chemical Corporation, New York, N. Y., has announced the availability of Methyl Cyclohexanone, a solvent particularly used for vinyl resins, nitrocellulose, natural and synthetic resins, as well for the manufacture of lacquers and printing inks.

TRY NUOSPERSE® 657

Nuosperse 657 works better in more formulations than any other wetting, dispersing and anti-settling agent.

No "butts" about it... now there's new hope for faster quality production of those tricky formulations! In actual production situations, Nuosperse 657 has *proved* its ability to help make good paint better by providing such advantages as these:

improved DISPERSION in:
Odorless Enamels; Phthalocyanine Blue, Cadmium Red, Red Oxide in Alkyds; Iron Blue, Burnt Umber in Short Oil Alkyds.

improved ANTI-SETTLING in:
Industrial Primers; Chrome Orange, Ultramarine Blue in Alkyds.

improved WETTING in:
Phthalocyanine Blue in Alkyds; Odorless Enamels; *Lamp Black in Long Oil Alkyds.

*Nuosperse 657 satisfactorily broke an unexpected gelling of a tinting paste.

Case histories that prove these examples are available on request; others are in preparation. Perhaps a specific problem of yours is listed here . . . or you may have one that's similar. Possibly it's one you have not yet encountered. In any event, Nuosperse 657 may provide the solution.

BUT...LET'S FACE FACTS: We do *not* claim that NUOSPERSE 657 can solve *every* production problem. *Yet we have found that it has a greater range of effectiveness than all similar agents tested.*

WHY NOT TRY IT?
We'll rush you a special trial kit at the drum price. If it doesn't help you solve a problem, return the unused portion and we'll give you full credit.

***and for other ways to help make* GOOD PAINT BETTER...**

...try NUODEX EXKINS (anti-skinning agents); NUACT PASTE (loss-of-dry inhibitor); NUADE (roller-mill grinding aid); SUPER AD-IT (paint mildewcide) ... and for *all* your formulations: NUODEX NAPHTHENATE, NUOLATE, OCTOATE and ODOREX — *the original certified-metal-content Driers.* All of these products are developments of Nuodex research ... planned, produced and distributed by the same exacting methods — with the same consistent quality — that have made them the *standards of the industry.*

NUODEX PRODUCTS CO., INC.
Elizabeth, N. J.

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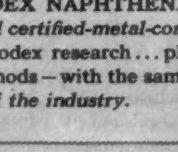
Signature_____

Company_____

Shipping Address_____

City_____ Zone____ State_____

NUODEX
Special Purpose Chemicals To Serve Industry



Plants at:
Elizabeth and Newark, N. J., Long Beach, Calif.; and Leaside (Toronto), Ontario, Canada

FUNGI GROWTH

(From page 24)

must be paid to the question of the degree of interference with the other properties of paint films. It is known, for instance, that phenolic additions or additions containing amines to oil paints may delay the drying of films by many weeks, depending on the amounts of substance added. Besides, additions of 1 or 2 percent. of hydrophylous substances may considerably increase the swelling tendencies of films, inducing a corresponding reduction of resistance against the growth of fungi.

Conclusions

1. Almost any vehicle can be attacked by certain types of fungi if internal and external conditions are favorable to their development and growth.
2. Conditions favoring the growth of fungi on paint films are moisture and moderate heat. Low temperatures and dryness reduce their rate of growth.
3. The action of pigments on the growth of the mycelium of fungi is due to mechanical resistance as well as to specific toxic reactions.
4. The damages induced by the growth of fungi consist of appreciable reductions of hardness and pliability of the films on one hand and of a considerable increase of swelling capacity on the other. Where fungi attack exceeds a certain limit, paint films lose their surface-protecting capacity.
5. Growth of fungi can be prevented by two methods:- a) Elimination of external conditions favorable to the growth of fungi and b) addition of toxic substances without interfering with the other properties of paint films.

Literature Cited

1. J.D'Ans, Zeitschrift fur Angewandte Chemie, 1928 (41) pp. 1193 ff
2. E. Strasburger, Lehrbuch der Botanik, Jena, 1947, p. 303
3. O. A. Gardner, Scientific Section Circular 442,-242 (1933)
4. Goll, Coffey and Smith, Review, 1948, No. 126, p.439 and 1949, No. 127, p.l
5. R. Kempf and F. J. Peters, Farbenzeitung, 1934 (39) P. 1019
6. M. W. Wilson and Th.M.Mc.Miken, Paint, Colour, Oil, Varnish Ink, Lacquer Manufacture, 1939 (9) p. 181
7. See:- E. Strasburger, Lehrbuch der Botanik, Jena, pp. 355, 356, and 360
8. Chipping Test by Peters

Table V

ADDITIONS (TO LINSEED OIL) TOXIC TO FUNGI

Addition	Time of Growth Day 3	6	12	18	24	30	Rate of Growth mm./day
	Diameter of attacked area—mm.						
Varnish linseed oil	6	8	16	21	29	35	1.17
0.2% Addition							
Sodium silico-fluoride	1	2	3	4	6	8	0.27
Zinc chloride	1	1	3	6	10	13	0.43
Benzoic acid	4	6	10	13	14	15	0.50
Salicylic acid	5	8	14	18	23	30	1.00
p-Chlor-benzoic acid	0.5	2	3	6	7	8	0.27
Phenol	2	3	5	7	11	12	0.40
% Addition							
Sodium silico-fluoride	0.5	1	3	4	7	8	0.27
Zinc chloride	1	1	3	6	10	13	0.43
Benzoic acid	4	7	10	13	14	15	0.50
Salicylic acid	5	9	15	19	24	28	0.93
p-Chlor-benzoic acid	0	0	0.5	2	4	5	0.17
Phenol	2	3	6	8	9	11	0.37

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ACS Paint Div. To Hold Meeting Mar. 24-27

The Division of Paint, Plastics and Printing Ink Chemistry of the American Chemical Society will be one of the participating groups in the 125th National ACS Meeting scheduled March 24-27, at the Hotel Aladdin in Kansas City, Mo.

John K. Wise and Allen L. Alexander are chairman and secretary of the Division, respectively.

Program details of the Division follow:

Wednesday, March 24

Afternoon Session: John K. Wise, presiding.

2:00 *Introductory Remarks*, Mr. Wise.

2:10 *A Statistical Study of the Operation and Design of the Adherometer and the Resulting Changes*, L. Reed Brantley, Reginald Stabler, John F. Charnell and Kenneth Bills, Jr.

2:45 *The High Polymer Theory of the Wrinkle Phenomenon*, Harry Burrell.

3:30 *Universal Type Chemical Finishes for Glass Fibers Used in Reinforced Plastics*, Porter W. Erickson, Irving Silver, and H. A. Perry, Jr.

4:15 *Studies on the Uniformity in the Formation of Latex Paint Films*, Max Kronstein, Ralph W. Muschett, Edward J. Dypa, and Arthur Staheli.

Thursday, March 25

Afternoon Session:

C. E. Reed, Presiding. Symposium on Applications of Silicones; Jointly with Division of Industrial and Engineering Chemistry.

2:00 *Introductory Remarks*, Mr. Reed.

2:10 *Relation Between Structure and Properties of Silicones*, R. R. McGregor.

3:30 *The Application of Silicones in the Protective Coating Field*, M. A. Glaser.

Friday, March 26

Morning and Afternoon Session: R. W. Quarles, Presiding.

Symposium on Industrial Rheology

9:00 *Introductory Remarks*, Mr. Quarles.

9:15 *Anomalous Flow Behavior of Dispersions*, Raymond R. Myers and A. C. Zettlemoyer.

9:45 *Non- Newtonian Flow and Its Measurement*, S. H. Maron.

10:15 *Flow Properties of Vinyl Chloride Resin Plastisols*, E. T. Servers and J. M. Austin.

10:45 *Rheology of Filled Siloxane Polymers*, E. L. Warrick.

11:15 *Rheology or Printing Inks 4-Initial Trapping and Picking Studies*, A. C. Zettlemoyer, C. T. Dickert, and Raymond R. Myers.

2:00 *Design of Crosshead Sheeting Dies*, J. F. Carley.

2:30 *Rheology of Printing in Molding I-Fundamental Analyses of the Injection Molding Cycle*, C. E. Beyer, R. S. Spencer, and F. E. Towsley.

3:00 *Rheology in Molding II-Inside the Injection Mold* (16-mm. motion picture), C. E. Beyer, R. S. Spencer and F. E. Towsley.

3:30 *Rheology in Molding III-Polymer Pressure and Temperature Relations in the Injection Molding Process*, C. E. Beyer, R. S. Spencer and F. E. Towsley.

4:00 *Some Observations on Stress-Creep Crazing of Methacrylate Polymers*, T. F. Protzman, J. J. Gouza, and W. F. Bartoe.

Saturday, March 27

Morning Session: A. C. Zettlemoyer, Presiding.

9:00 *Epoxy Esters as Plasticizers and Stabilizers for Polyvinyl Chloride*, H. B. Knight, Lee P. Witnauer, W. E. Palm, R. E. Koos, and Daniel Swern.

9:45 *Coatings Based on Blends of Polyamide Resins and Epoxy Resins*, M. M. Renfrew, H. A. Wittcoff, D. E. Floyd, and D. W. Glaser.

10:30 *Emulsion-Polymerized Polysulfone Resins*, W. W. Crouch and J. E. Wicklatz.

•

Recently Formed Dow Corning Ltd. Moves To New Building in Toronto

Dr. W. R. Collings, Vice President and General Manager of Dow Corning Corp., Midland, Mich., has announced that its recently organized Canadian subsidiary, Dow Corning Limited, has moved into a new office and warehouse building on Tippet Road, Wilson Heights, Toronto.

The structure contains 2000 square feet of office space and 100,000 square feet of warehouse area.

The Canadian firm was formed to take over sales service and warehousing operations for Dow Corning, which since 1945 had been carried on by Fiberglas Canada Limited.

Dr. Collings also announced the appointment of D. C. R. Miller as general manager of the new company.

Other executive officers of the firm are: Dr. Collings, President; Dr. Shailer L. Bass, Vice President; William C. Blackburn, Secretary; and Burl D. Huber, Treasurer. The Board of Directors is composed of Dr. Bass, Mr. Blackburn, Olin D. Blessing, Dr. Collings, Howard N. Fenn, Mr. Huber, Ira W. Hutchison and Mr. Miller.

Du Pont To Build Pigment Colors Research Lab. at Its Newark Plant

A new pigment colors research laboratory will be built by Du Pont at its Newark, N. J., Pigments Plant, the company announced late last month.

A colors research program, now being conducted at several locations at the plant, will be consolidated in the new building where members of the research staff also will have their offices.

Dr. J. Nelson Tully, Laboratory Director, said ground is expected to be broken for the two-story structure about April 1.

•

Cleveland Paint, Varnish and Lacquer Assoc. Holds Meeting

Various phases of industrial sales and purchasing were discussed by a four-man panel at a dinner meeting of the Cleveland Paint, Varnish and Lacquer Association on January 14, at the Hotel Carter, Cleveland.

Howard E. Wise, former President of the Arco Company, Cleveland, was moderator.

Panel speakers were: Bruce Wells, Vice President of the Arco and Ferbert-Schorndorfer Companies; T. N. Armel, National Industrial Sales Manager of the Glidden Company, and Normall Cornell, Vice President of the Gibson-Homans Company.

•

Morris W. Sheppard, Hercules Powder Co. Executive, Retires

Morris W. Sheppard, an executive of the Hercules Powder Company since it was founded in 1913 and director of the firm's Traffic Department since it was founded 1920, retired March 1.

He became associated with the du Pont Company in 1908 as a member of the Traffic Department joining the newly organized Hercules Powder Company five years later as assistant traffic manager.

Mr. Sheppard was named traffic manager in 1920. The title was changed to Director of Traffic in 1945.

During World War II, he was responsible for the movement by rail, truck, and air of close to two million pounds of military explosives and propellants produced by Hercules for U. S. and Allied armed forces in six government-owned ordinance plants throughout the nation.

•

El Dorado Names Reisman Corp. Sales Agent in New England

The H. Reisman Corporation, New York, N. Y., has been appointed exclusive representative in the New England states for El Dorado Oil Works.

Reisman also represents the El Dorado Oil Works in the Mid-Atlantic states and New York.

Cabot Appoints Wollastonite Sales Agent for Metropolitan N. Y. Area

Godfrey L. Cabot, Inc., Boston, Mass., White Pigments Division, has appointed the D. H. Litter Company, Inc., New York, N. Y., as sales agents for Wollastonite to the paint, floor-covering and allied industries in the metropolitan New York area.

Wollastonite, a calcium metasilicate, is a new paint extender which is said to contribute high flatting efficiency, hard film properties, excellent holdout, and fast grinding in house paints, interior flats, primer-surfacers and latex finishes.

Chicago Production Club Plans Papers for 1954 Federation Meeting

The Chicago Paint and Varnish Production Club has announced the list of papers it will work on for the 1954 Meeting of the Federation of Paint and Varnish Clubs.

Co-Charimen of the Committee that will prepare the papers are L. Ludwig, Sherwin-Williams Company, and P. de Leeuw, Glidden Company, Nubian Division.

The papers are: Evaluation of Mildew Resistant Addition to Paints; Evaluation of Painting over Impregnated Woods; Preservation of Latex Paints; Evaluation of Variation in Steel Preparation in Industrial Finishing; Indexing of Formulas and Product Properties; Possibilities of Use of Polyesters in Paint Finishes; Continuation of Previous Work on Filtering and Straining Paint Materials; Continuation of Viscosity Measurements by Ultrasonic Probe, and Color Comparison on Various Instruments.

•

Davison Corporation Reorganizes Research & Development Division

The Davison Chemical Corporation's Research and Development Division has announced several new appointments and a revised plan of organization.

Dr. P. L. Veltman has been promoted to Director of Research and Development. He was formerly Manager of the Curtis Bay (Baltimore) Laboratories. Ralph E. Hope, previously Manager of Research Engineering, has been made an assistant director. L. L. Barel has been named to succeed him as Manager of Research Engineering. W. K. O'Loughlin has also been appointed an assistant director.

Edwin M. Glocker, formerly staff assistant to Dr. P. W. Bachman, Vice President in Charge of the Research and Development Division, has been made manager of the newly formed Research Statistics Department.

Luther O. Young is Manager of the Application Research Department, also a newly formed post. Dr. Bachman's staff assistants are C. D. Helm and A. J. Antonious.

•

DeSoto Paint & Varnish Company Builds New Resin Plant in Tex.

The DeSoto Paint and Varnish Company has completed construction on its new Resin Plant at Garland, Tex. Production capacity of the plant, located adjacent to the company's recently finished plant manufacturing facility at Garland, is two million gallons per year.

In addition to manufacturing ingredients for paint, the new plant is also designed to produce electrical insulating varnishes and other products allied to the paint industry.

According to a company spokesman, the capacity of the plant may be doubled without impairing present facilities. He added that the process area, including the heating system for the process kettles, is explosion and spark proof.

•

ADM Grants Chemical Engineering Fellowship at Iowa State Univ.

The Archer-Daniels-Midland Company has continued its graduate fellowship in Chemical Engineering at the State University of Iowa, Iowa City, for the 1954 school year.

Nelson Reeds, a former resident of Iowa City, has been appointed to the fellowship which carries a cash stipend of $1,900 for each full year of graduate study in Chemical Engineering.

The fellowship is granted through the Chemical Engineering Department and will be supervised by Dr. Karl Kammermeyer, Professor and Head of Chemical Engineering at Iowa State.

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new and improved products. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

AMERICAN CAN

RING SEAL FOR CANS

Meets Postal Requirements

Ring seal that meets post office requirements for shipping filled paint cans through the mail is now being provided as an added service to customers by the American Can Co. This seal is designed for use by mail order houses and others who ship large volumes of paint by parcel post. This seal is said to provide faster and more economical handling, since this firm's double-tite paint cans had to be "solder-tacked" to the cans before the filled containers could be mailed.

This ring seal is crimped on over the edges of the container top and "locks" the plug to the can. There is a tear tab on the rim for easy opening. Seals carry a statement of post office approval. The rings have raised lugs to facilitate stacking and come in sizes that will fit practically every type of paint can, and thus eases customer inventory problems, according to the manufacturer. American Can Co., 100 Park Ave., New York, N. Y.

DRUM FILLER

For 55-gallon Drums

Drum filler is said to provide low-cost, semi-automatic packaging liquids in 55-gallon drums. Unit will handle a flow of from 200 to 600 drums per eight-hour shift and will reduce overfill losses to a minimum, according to the manufacturer. The filling lance is fully submerged, thus eliminating the opportunity for static spark discharge, and reducing the tendency to foaming. Will accomodate a wide range of fluids, including gasoline, fuels, liquid sugars, paints, inks and chemicals. The Rucker Co., 4228 Hollis St., Oakland 8, Calif.

WEST BEND

PORTABLE ELEVATOR

For Barrel Handling

According to the manufacturer, one workman can lift and transport safely any weight, size or type barrel with this new hand operated portable elevator. Other features of this elevator are: it is self-contained, available in any capacity and made for hand, electro-hydraulic or full electric power, is of all-welded channel construction, and the mast is hinged to permit passage through doorways or low obstacles. West Bend Equipment Corp., West Bend, Wis.

BUTYLENE OXIDE ISOMERS

For Commercial Use

Butylene oxide straight chain isomers is a mixture predominately composed of 1, 2-butylene oxide with small amounts of cis-and trans-2,3-butylene oxide. It contains less than 1 percent isobutylene oxide.

This material is very reactive in polymerization reactions to produce polybutoxy-type compounds. According to the producer, this compound will extend the use of epoxide compounds for emulsifiers, plasticizers, intermediates, etc.

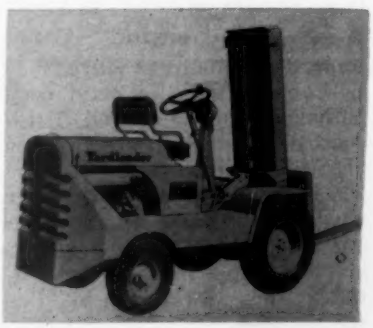
For complete details on this new compound, write to The Dow Chemical Co., Midland, Mich.

FORK TRUCK

For Rough-Surface Work

4000-pound fork truck is designed for outside or rough-surface work. Features a travel speed of 14 miles per hr., according to the manufacturer. Recommended for yard handling jobs requiring movement of materials over large areas. Utilizes low-pressure hydraulic system and motor-driven gear pump supplies oil under pressure to either lifting or tilting cylinders, with speed controlled by acceleration of the engines; excess is by-passed to the reservoir. Baker-Raulang Co., Baker Industrial Truck Div., 1230 W. 80th St., Cleveland 2, Ohio.

BAKER-RAULANG



NEW MATERIALS — EQUIPMENT

EPWORTH

AGITATOR TANK DRIVE
Portable Type

Versatile portable tank drive can be attached to any rigid top tank, or can be attached to a non-rigid top by using angle irons. According to claims of the manufacturer, this drive can be used to replace bevel gear clutch gang agitator drives, using existing agitator shafts and blades. Other uses include propelling hand turbine or paddle blade agitators; may be employed with either a bottom step bearing, or outboard reducer bearing. This drive may be utilized with a stuffing box for pressurized tank systems, and can be supplied to fit the customer's electric motor. Available in 3 types. This unit is said to reduce fire hazards.

In ordering, the horsepower and agitator shaft RPM should be established either by previous experience, or from data in the "Emco Agitator Handbook," available upon request. Epworth Manufacturing Co., 6587 Epworth Blvd., Detroit 10, Mich.

PLASTICIZERS
Improves Flexibility of Vinyls

"Cabflex ODP (iso-octyl decyl phthalate) and Cabflex ODA (iso-octyl decyl adipate) are two new plasticizers in the "Cabflex line, which according to the producer, have low volatility, and offer improved flexibility permanence in vinyl compounds. Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass.

PAPER PAINT PAILS
For Promoting Mfrs. Brands

Paper paint pails are recommended for the commercial or home user to avoid messy clean-up and cut down time on a painting job.

Sturdy, yet light in weight, these pails eliminate time-consuming bucket cleaning and are convenient for intermixing paints or as a work pail. Wire handles, which are sold separately can be reused from time to time. When the paint job is finished, the used pail is thrown away and the handle slipped on to a new pail. The No. 5, 2-½ is recommended for the home users; No. 10 and 5-quart capacity are suited for the commercial or contract painter. Available in brush design, plain white unprinted, or special print. These paper pails can be used in promoting paint firm's brands and products.

For further details on these pails, contact the Lily-Tulip Cup Corp., 122 E. 42nd St., New York 17, N. Y.

LILY-TULIP

LATEX POLYMER
Freeze-Thaw Stability

Freeze-thaw stable butadiene-styrene latex carries the product designation, P-556. It is used as a pigment binder for water emulsion paints and because of other unusual properties and low foaming characteristics, it can be used in the paper and related fields, according to the manufacturer. Data sheet P-29 provides complete information on this product and may be obtained by writing to the American Polymer Co., Chemical Div. of the Borden Co., Peabody, Mass.

HYDROCARBON RESIN
Experimental Quantities

"Alpex" is a hydrocarbon resin soluble in mineral spirits, forming highly resistant protective coatings, which can be used as a modifying agent in varnishes, drying oils and alkyds, and show a great variety of other possibilities, according to the producer. Its solubility in mineral spirits and higher boiling low K. B. aliphatic solvents also makes it useable in printing inks.

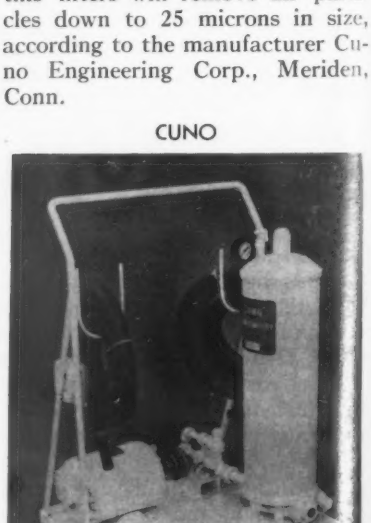
Manufacturing rights for the "Alpex" process, which was developed some years ago by Chemische Werke Albert, in Germany, was recently acquired by the Alkydol laboratories, Inc.

Experimental quantities are available from the Alkydol Laboratories, Inc., 3242 S. 50th Ave., Cicero 50, Ill.

PORTABLE FILTER
For Maintenance Use

Portable filter is equipped with pump, motor, oil resistant hose, gauges and filter. This unit is said to be of interest to plant operators and maintenance men who are in need of a micronic filter unit that can be easily moved from machine to machine. It filters such fluids as lube and hydraulic oils, coolants and a wide range of heavy and thin industrial fluids. Equipped with gear pump which has a capacity of 4 GPM., this filters will remove all particles down to 25 microns in size, according to the manufacturer Cuno Engineering Corp., Meriden, Conn.

CUNO



NEW MATERIALS — EQUIPMENT

ZIRCONIUM DRIER
Solves Leafing Problems

Non-leafing and poor through drying that have been connected with ready-mixed aluminum paints have been solved through the use of Zirco Drier Catalyst 6%, according to the manufacturer. It is claimed that good bottom drying that previously could have been obtainable only at the expense of leafing is now obtained almost immediately by the inclusion of this catalyst as part of the drier system. Studies have shown that there are no deleterious effects on the leafing properties of ready-mixed aluminum paints formulated with this drier. Other properties this drier imparts include: improved film characteristics such as freedom from wrinkling, enhanced durability, tougher film, retention of flexibility, improved adhesion and package stability. Advance Solvents & Chemical Corp., 245 Fifth Ave., New York 16, N. Y.

VINYL ACETATE COPOLYMER
Internally Plasticized

"Everflex G" is a polyvinyl acetate copolymer which, according to the manufacturer, imparts good water-resistance properties when formulated into water-based paints. The producer pointed out in a recent report that field tests over 18 months indicate that emulsion paints based on this copolymer can be used on exterior surfaces with good results. This copolymer can also be used for manufacturing interior and exterior masonry paints.

No chemical plasticizers are needed with this particular copolymer because of its internal plasticization. Thus, this eliminates a tendency toward progressive embrittlement caused by plasticizer migration, the manufacturer claims.

It is said that paints based on "Everflex G" have all the properties found in regular polyvinyl acetate paints, including color stability, non-oxidation, scrub resistance, good adhesion and plasticity and freeze-thaw resistance. For further details on this copolymer write to Dewy and Almy Chemical Co., Cambridge, Mass.

A dependable course to steer by...

Like the North Star—whose position is changeless—some companies are *known* for dependability . . . Their high standards and integrity single them out.

In business, these qualities in any firm you deal with contribute to your success in charting the progress of your own.

All this involves a relationship that transcends the mere filling of orders . . . with good materials . . . on time.

Since the turn of the century, many men at the helm of businesses, big and small, have put complete trust in the integrity of Canco.

Needing new and better containers for their products, they have looked to Canco's unequaled variety of technical skills, research, and services . . . its quick, sure solutions to special problems . . . its experience and facilities that no other manufacturer can match.

If you pack your products in containers, your course is clear. You'll be ahead if you . . .

Go first to the people who <u>are</u> first!

AMERICAN CAN COMPANY

CANCO

New York, Chicago, San Francisco; Hamilton, Canada

Canco offers you the finest full line of paint, putty and turp cans available anywhere. Through the years Canco, in cooperation with your industry, has helped you *sell* in all markets more efficiently, more effectively.

West Coast Symposium and Paint Show Scheduled March 25 to 27

The Second Pacific Coast Symposium and Paint Materials and Equipment Show will be held March 25-27, at the Hotel Fairmont, in San Francisco.

Frank Gentes of the Dow Chemical Company, and chairman of the Technical Committee for the symposium, has announced the program which will include the following:

Thursday, March 25

Afternoon Session:

Fungus and Fungicides, Charles Yeager, Technical Director, Scientific Oil Compounding Co.

Recent Development in Iron Oxide Pigments, Irwin C. Clair, Assistant Research Director, C. K. Williams & Company, Easton, Pa.

Panel Discussion: *How Do Technical Departments Coordinate with Production and Sales.* This will be conducted by the Technical Committee of the Golden Gate Paint and Varnish Production Club, and the moderator will be Frank Wilson.

The panel discussion will cover:

Control Labs, Jim Ewell, Pabco Products.

Technical Field Service, Grant Arhart, Pacific Paint & Varnish Company.

Sales-Technical Relationship, Paul Hamlin, National Lead Company.

Contact Between Technical and Raw Material Men, Jack Robinson, International Paint Company.

Friday, March 26

Morning Session:

Vinyl Monomer Modification of Vehicles, Walter A. Henson of the Coating Technical Service, Dow Chemical Company, Midland, Mich.

Application of the Fluorescent Indicator Adsorption Method to Protective Coating Solvents, J. D. Giannotti, E. Segundo Laboratories, California Research Corporation, Richmond, Calif.

Present Status of Alkyd and Epoxy Resins in the Coatings Industry, J. M. Thomas, Sales Manager, Jones-Dabney Company, Division of Devoe & Raynolds Company, Inc., Louisville, Ky.

Afternoon Session:

A Contractor Looks at Paint, Raplh Exley, Russell Hinton Company, painting contractors.

Panel Discussion: *What Does the Consumer Think?* Sunset Magazine, Menlo Park, Calif., is sponsoring the panel session.

Panel moderator will be Walter Doty, editor. The participants will include: Mrs. Margo Bottsford, housewife; Les J. Ludke, Ludke's Menlo Paint Store; John C. Campbell, Campbell and Wong, architects; Mrs. Arlene F. Coddington, Elizabeth Banning, color consultants; and Douglas Baylis, landscape architect.

•

Joint Paint Industry Coordinating Comm. Holds First Meeting Feb. 3

The Joint Paint Industry Coordinating Committee held its first regular meeting February 3, in Washington, D. C.

John B. Dewar of the Painting and Decorating Contractors of America was elected chairman; D. H. Moran, National Paint, Varnish and Lacquer Association, Vice Chairman; and Irwin E. Douglas, Retail Paint and Wallpaper Distributors of America, Secretary-Treasurer.

Do It Yourself, and Inter-Industry Merchandising subcommittees were formed to report on specific problems. They will consider the "Do It Yourself" trend, report its effect on the paint industry, and the present merchandising techniques of the industry.

•

Minnesota Paint Honors Three Employees for 25-Years Service

Minnesota Paint Incorporated, Fort Wayne, Ind., recently awarded three of their employees with gold watches for 25 years' service with the firm.

The employees, Joe Ellowsky, Arnold Thorson and Lauries G. Wakefield, were honored at a dinner held at the Van Orman Hotel in Fort Wayne.

L. T. Gartner, President of Minnesota, made the presentations.

Personnel Changes

AMERICAN CYANAMID

Ray L. Corcoran has been appointed Eastern Regional Sales Manager. He succeeds **Clifford D. Siverd** who has been named Assistant to the General Manager, Pigments Division. Mr. Corcoran joined the former United Color and Pigment Corporation in 1929. Mr. Siverd joined the former United Color and Pigment Corporation in 1935. He was made Eastern Regional Sales Manager of the Pigment Department in 1948.

NUODEX

Edward D. Hogan has been named Director of the newly created Commercial Development Dept. of the Nuodex Products Company, Inc., Elizabeth, N. J. The function of this department, according to Leo Roon, Nuodex president, is to devise and explore methods for the market introduction of new products and find new applications for established products. Nuodex manufactures chemicals for the paint industry.

E. D. Hogan

H. Schleitwiler

H. R. Baxter

NATIONAL CAN

Hal Schleitwiler has been appointed Manager of Industrial Relations. He will be located at the company's executive office in Chicago. Before joining National Can, Mr. Schleitwiler was Personnel Manager of the Central Division of Kraft Foods Company for five years.

H. R. Baxter has been elected to the Board of Directors of National Can. He is also Vice President and Treasurer of the Donner Corporation, a private investment advisory company which manages the trust funds of the members of the William H. Donner family.

MARBON CORP.

Lawrence E. Stanton has been appointed Technical Service Representative for the Southern States. Prior to joining the Marbon Corporation in January, 1952, he was a laboratory technician for the U. S. Rubber Company, Chicago plant.

L. E. Stanton

Since joining Marbon, Mr. Stanton has undergone an intensive training program in their technical service laboratories. He is a graduate of Elmhurst College in Elmhurst, Ill.

AMERICAN-MARIETTA

Ray L. Oughton has been appointed to the newly created post of Vice Chairman of the Board, and **Robert E. Pflaumer** has been named President of the Company, succeeding **H. L. Hemingway.** Mr. Oughton has been Executive Vice President at American Marietta since 1945. Mr. Pflaumer has been a vice president since 1948.

MORRIS PAINT

George W. Schmidt has been named to cover the northern Kansas territory. **Arthur Metzsch,** has been appointed representative in the Nebraska territory.

Robert Watterson has been named advertising manager. His activities will cover dealer and local advertising.

Bringing up the proof

that Dutch Boy Basic Silicate White Lead* **"45X"**

has what it takes to make foolproof exterior paints

When it comes to exterior paints, experienced paint makers are pretty likely to be "lead" men. In their book, there's no better way to insure foolproof formulation.

What type of "lead"?

Today, "Dutch Boy" Basic Silicate White Lead "45X" is the reigning favorite – because it's "lead" in its most economical form.

Exposure tests at National Lead's Sayville Test Station where tests of many different pigments have been conducted year after year, prove beyond question that "45X" has what it takes to make foolproof exterior paints.

And the fact that complaints drop way down when "45X" is used documents this proof most convincingly with paint makers!

Fewer complaints with "45X" because...

In white House Paints, "Dutch Boy" Basic Silicate White Lead "45X" improves self-cleaning properties.

In tinted House Paints, it increases film durability and resistance to color changes.

In Primers, it contributes greater adhesion, plus the water resistance to maintain the paint film's adhesive bond.

In Porch and Floor Enamels, "45X" plasticizes the film, increases abrasion resistance, and improves adhesion.

It's more economical, too. You use fewer pounds of "45X" than of other white lead types. That's because the reactive portion of each pigment particle is concentrated at the surface and, thus, proportionately larger amounts of "lead" are made available.

Make sure your exterior paints are foolproof. Use "Dutch Boy" Basic Silicate White Lead "45X" in your formulations.

National Lead Company: New York 6; Atlanta; Buffalo 3; Chicago 80; Cincinnati 3; Cleveland 13; Dallas 2; Philadelphia 25; Pittsburgh 12; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.).

*Reg. U. S. Pat. Off.

CARBIDE & CARBON

Dr. Walter K. Asbeck has joined the staff of the Research and Development at South Charleston, West Va. He will be concerned primarily with work on new and improved vinyl resins and related products for use in the surface coatings and dispersions application fields. Dr. Asbeck has written several papers on the characteristics of pigment dispersions—critical pigment-volume relationships, electro-kinetic phenomena, and, especially, the measurement of flow properties in disperse system.

Dr. W. K. Asbeck

CELANESE

John J. Bress has joined the Product Development Department of the Chemical Division as Technical Service Engineer. He is attached to the Application Laboratory of the Division at Summit, N. J., and will work with vinyl acetate emulsion paint formulations. Before joining Celanese, Mr. Bress was with the Atlas Powder Company and Eaglo Paint and Varnish Company.

AMERICAN CYANAMID

George W. Russell has been named Assistant General Manager of the firm's newly formed Pigments Division. He joined American Cyanamid's Market Development Department in 1946. Most recently he was Manager of the Manufacturers Chemicals Department of the Industrial Chemical Division.

R. D. Freriks

H. H. Robinson

RINSHED-MASON

Paul J. Keller has been appointed Chief Chemical Engineer of the Detroit plant, as well as the Anheim, Calif., and Windsor, Ontario, Canada, subsidiaries. He will be responsible for maintenance and capital improvements. **Roger D. Freriks** has been named Factory Manager of the Detroit plant. His new responsibilities include complete charge of all manufacturing operations and production facilities. **Howard H. Robinson, Jr.,** has been appointed Assistant Factory Manager He will be in charge of production planning and scheduling.

P. J. Keller

DEWEY AND ALMY

David G. Bernard has been appointed sales manager of the Cambridge Container Division. He succeeds **W. M. Rand, Jr.,** who has joined the staff of the Vice President and General sales Manager, George W. Blackwood. Mr. Bernard joined the firm in 1947.

HERCULES POWDER

Herbert W. Jervis has been named Director of the Traffic Department. He succeeds **Morris W. Sheppard,** who retired March 1, of this year. Mr. Jervis joined Hercules' Traffic Department in 1925.

Alexander W. Fraser replaces Mr. Jervis as Assistant Director. He joined the Traffic Department in 1940.

ACHESON INDUSTRIES

Harold Higinbotham, Technical Director of Acheson Colloids Limited, London, unit of Acheson Industries, Inc., New York, has retired from active service although remaining on the Board of Directors.

Howard A. Acheson, President of Acheson Industries, Inc., retains the position of Managing Director while **E. G. Clarke** has been appointed Assistant Managing Director.

DEVOE-RAYNOLDS

James Henry Rodenbush has been named Branch Manager of the firm's newly created branch in Pittsburgh, Pa. For the past two years, he had been a Devoe dealer in the Pittsburgh area.

G-E

Boyette Edwards, Jr., has been named supervisor of industrial engineering for the Phenolic Products Plant of General Electric's Chemical Materials Department. He joined the Chemical Division as an industrial engineer in the firm's Manufacturing Department.

STANDARD-TOCH

Carl Bauer has been elected president; **J. Robert Strohm** as vice president in charge of industrial sales to succeed Mr. Bauer; and **William G. Torrace** as vice president and director. Mr. Bauer joined Standard-Toch in 1942, as a chemical engineer. He was elected vice president in charge of industrial sales in 1949. Mr. Strohm came to the firm in 1946 as plant engineer. Mr. Torrace joined the company in 1953 as comptroller.

W. Burchard Day, who recently retired as chairman of the board of Standard-Toch, was associated with the firm for 45 years.

E. D. Kress

T. M. Riley

PITTSBURGH PLATE

William H. Hogben has been named to the newly created position of Executive Manager, automotive accounts of Ditzler Color Division in Detroit. **E. Dudley Kress** is succeeding Mr. Hogben as Industrial Sales Manager for the Ditzler Color Division. Mr. Hogben joined the firm's Milwaukee Paint Division in 1921. Mr. Kress started with the Ditzler Color Division in 1931. Prior to his appointment he was general assistant manager of industrial sales for Ditzler. **Earl H. Heaton** has been named Assistant to the Industrial Sales Manager at Ditzler.

W. H. Hogben

Thomas M. Riley has been named Assistant Paint and Brush Advertising Manager. He joined the firm's Pacific Coast Paint Division in 1937. Since 1951 he has served as the division's manager of purchasing and advertising.

AMSCO

Robert L. Moore, Jr., has been named manager of Amsco's Mid-South Division with offices at Jackson, Miss. He succeeds **Thomas Parker** who is moving to the sales staff of the company's headquarters in Chicago. Mr. Moore will be responsible for the marketing of the firm's line of technical naphthas in Mississippi, Alabama, Louisiana, Missouri and portions of Florida and Tennessee.

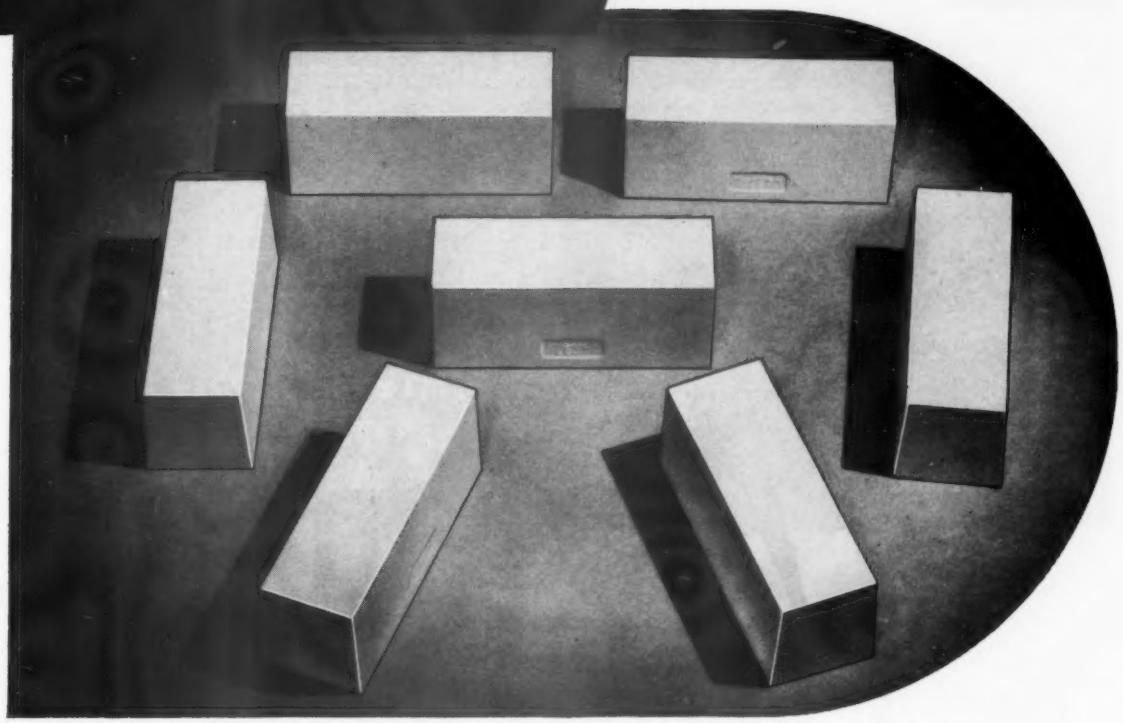
INDUSTRIAL FILTER

K. C. Johnson has been transferred from the firm's home office in Chicago, to the Pacific coast as regional field engineer. He will work out of the company's offices in Los Angeles and San Francisco, Calif. Mr. Johnson joined the Industrial Filter & Pump Manufacturing Company in 1949.

J. C. Hesler has joined the firm as head of the expanded Water and Waste Treatment Division. He has had 15 years of experience in the water and wastes treatment field.

McDANEL

Super High Density Mill Linings



● Introduced two years ago McDanel Super High Density Mill Linings have withstood all tests—Sales increases indicate wide acceptance. Wherever installed they have shown a saving in cost of bricks—approximately 44% —and because of their longer wearing qualities—2½ times longer than other linings—a great saving in down time and relining expense.

The bricks are of uniform hardness and composition—are white, and have a smooth grinding surface.

Installation procedure is the same as for other types of ceramic linings.

Other McDANEL Products

Laboratory Grinding Jars and Jar Mills

Special Shapes . . . Mill Head Assemblies

Tank and Dryer Linings

Grinding Balls (Porcelain or High Density)

Let us send you full information

McDANEL *Industrial* PORCELAINS

McDANEL REFRACTORY PORCELAIN CO.
BEAVER FALLS, PENNA.

SCHENECTADY VARNISH

Frank J. Igoe has been named Vice President in charge of Engineering and Employee Relations. He joined the firm in 1923 as a process engineer. Before that he had been with the Canadian General Electric Company at Peterborough, Ontario, where he was the assistant engineer of materials in charge of the laboratory, and with James Weir Varnish Company of Toronto, in charge of production and development.

F. J. Igoe

GOODYEAR

John Platner has been appointed to the firm's Chemical Division. In his new assignment, he will provide technical service to paint industries. Mr. Platner joined Goodyear's training squadron in 1947, and a year later was transferred to the research division where he remained until being named to his new duties.

GENERAL MILLS

Carl W. Weber has been named sales assistant in the Chemical Division. He will be responsible for office operations of the Division's sales Department at Kankakee, Ill. He joined General Mills in 1935.

CARBON DISPERSIONS

Edward J. Sheridan has been appointed Director of Technical Sales and Development. For the past seven years he was associated with the Sun Chemical Corporation where he was Superintendent of the A. C. Horn plant and for the past four years served as General Manager of the Pigments Division. Previous to working with the Sun Chemical, Mr. Sheridan was associated with the Interchemical Corporation.

E. J. Sheridan

CANCO

R. B. Thompson has been named assistant general manager of manufacture. Mr. Thompson, who had previously been manager of manufacture for the firm's Atlantic division, has been with American Can for 31 years. He will continue to make his headquarters in New York.

A. de Genaro, formerly assistant manager of manufacture for the Atlantic division, will succeed Mr. Thompson as division manager. He began his career with the company in 1925.

Mr. de Genaro's position as assistant manager of manufacture for the Atlantic division has been filled by **J. C. Souhan,** formerly manager of American Can's Hillside, N. J., plant and more recently an assistant to the general manager of manufacture.

KOPPERS

W. J. Reagan has been promoted from Personnel Manager to Assistant Plant Manager in Charge of Production. at Koppers' Kobuta plant at Monaca, Pa. His former position will be filled by **Arden A. Cambre** who was Assistant Personnel Manager. Mr. Reagan takes over the position formerly held by **Frank R. Garner** who was promoted Manager of the plant. Mr. Reagan joined the firm in 1948 as a process engineer. Mr. Cambre joined Koppers in 1946 as a cadet engineer.

SHELL CHEMICAL

F. E. Caddy, Plant Manager at Martinez, Calif., has been named Manager of the firm's new plant at Norco, La. **C. H. Plomteaux,** of Shell Chemical's Manufacturing Operations Department in New York, will be Assistant Superintendent. Mr. Caddy joined Shell in 1931. He became plant manager at Martinez in 1951. Mr. Plomteaux joined Shell in 1940.

VELSICOL RESINS
AD·21
AB·11·2

For High Lustre, Good Leafing Aluminum Paints

Velsicol Resins AD-21 and AB-11-2 are especially suitable for economical excellent quality aluminum vehicles and ready-mixed aluminum paints. These neutral hydrocarbon resins are soluble in both aliphatic and aromatic naphthas, and are compatible with bodied vegetable and marine drying oils. They impart fast-drying characteristics. Solutions of the resins have high surface tension properties which promote leafing and flooding of aluminum pigment. The non-acidity of the solutions favors long leaf retentivity. AD-21 and AB-11-2 are available in either solid or solution form. For information and advice about their use, write to the Velsicol Corp. Technical Department.

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- Extenders for 100% oil soluble phenolic resins.
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- Metal primers.
- Drum coatings.
- Decorative can enamels.
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- Compatible with vegetable and marine drying oils.
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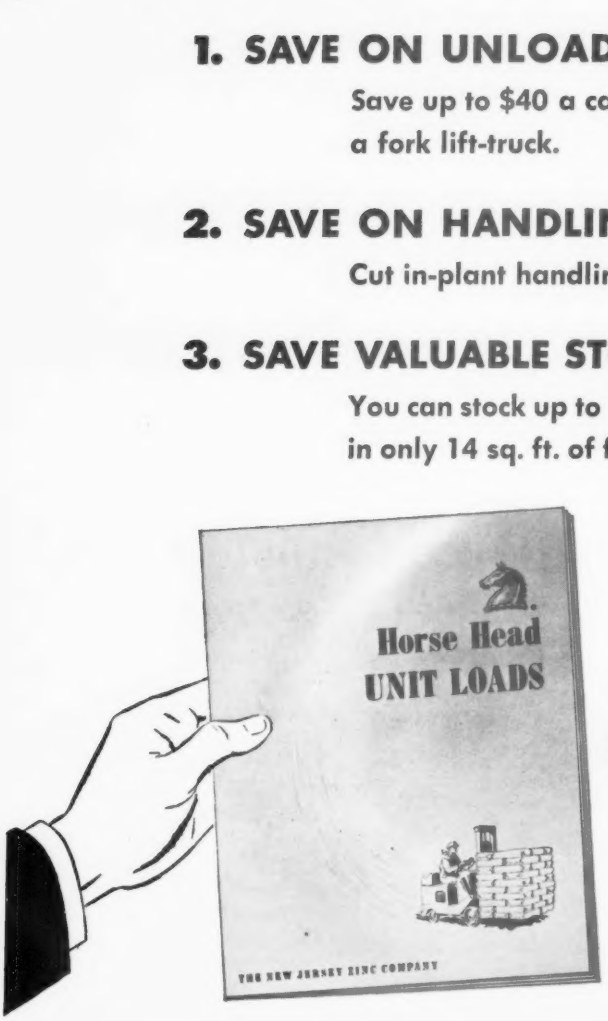

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Determining and Mixing Colors

U. S. Patent 2,666,715. Otto Syreeni, Helsinki, Finland

The method of blending red, yellow and blue coloring materials to a desired color intensity and shade comprising determining the reciprocal color intensity of the given coloring components of the desired color to be obtained and then blending the colors quantitatively in the ratio of their reciprocal color intensities to produce the desired shade and hue, said reciprocal color intensity being determined by measuring the minimum critical quantity of the coloring material of unknown coloring power required to produce a coloring effect upon a substantially stronger color containing a shade modifying quantity of a weaker color other than the unknown coloring material other than merely deepening the color thereof, said stronger color being selected from the group consisting of bright red, bright yellow and bright blue, and said unknown color being a color of this group other than the stronger color.

Heat Stabilization of Vinylidene Chlorides

U. S. Patent 2,666,040. Chris E. Best, Franklin Township, Summit County, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio, a corporation of Ohio.

A heat-stabilized composition comprising a crystalline resin selected from the group consisting of polymers of vinylidene chloride and copolymers thereof with other ethylenically unsaturated compounds copolymerizable therewith, said copolymers containing at least 80% of vinylidene chloride copolymerized therein, together with from 0.5 to 4.0% of pentachlorophenoxy propylene oxide homogeneously compounded therewith, said percentages being on the basis of the weight of said resin.

Preparing Novolaks

U. S. Patent 2,663,699. Herman Bloem and Marinus Stel, Eindhoven, Netherlands, assignors to Hartford National Bank and Trust Company, Hartford, Conn., as trustee.

A continuous process for preparing novolaks of the phenol-formaldehyde condensation product type comprising the steps of continuously introducing into a first reaction vessel a phenol selected from the group consisting of monohydroxybenzene, cresol, xylenol and resorcinol, a catalyst, and formaldehyde in an amount less than that required to completely react the phenol to phenol-formaldehyde and sufficien to maintain a stationary reaction condition in said first vessel, continuously withdrawing from the first reaction vessel a stream equal in volume to the streams of the reaction components entering the first reaction vessel, continuously introducing into a second reaction vessel the stream being withdrawn from the first reaction vessel, introducing a stream of formaldehyde into said second vessel in an amount sufficient to continue the reaction of the phenol without gelatinizing the reaction mixture, and successively repeating the steps of continuously introducing reaction mixture, adding a quantity of formaldehyde to the reaction mixture to continue the reaction without gelatinization and withdrawing an

amount equal in volume to that introduced in succeeding reaction vessels until the reaction is completed.

Tarnish-Resistant Bronze Powder

U. S. Patent 2,666,714. Joseph Halberstadt, Malone, N. Y., assignor to Malone Bronze Powder Works Inc., Malone, N. Y.

A process for treating commercial, initially fatty-lubricated, lamellar copper-base bronze powder, for rendering said powder resistant to tarnish discoloration, comprising confining such a powder within an enclosure, maintaining in said enclosure a treating gaseous atmosphere, heating the powder at temperatures above 300° C. and below the sintering temperature of the particular powder being treated, continuing the heating until the initial fatty lubricant has been decomposed into a hard, transparent, invisible film covering the individual particles of the powder, and using a treating atmosphere having no decarburizing action on the particle's film, said atmosphere consisting of a gas chosen among the hydrocarbon gases, nitrogen, helium, carbon monoxide and also carbon dioxide in presence of organic matter vapors.

Shortstopping of Butadiene Styrene Emulsion Polymerization

U. S. Patent 2,667,472. Robert W. Brown, Naugatuck, Conn., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey.

In the preparation of a synthetic rubber latex by the polymerization o an aqueous emulsion of a mixture o butadiene-1,3 and styrene, the step which comprise adding to the emulsio 0.1 to 1 part by weight of a xanthoge polysulfide containing 3 to 7 sulfu atoms per 100 parts by weight of poly merizable material initially present said xanthogen polysulfide additio being the first addition of the chemica and said addition being after conversio of 50 to 90% of the polymerizable ma terial originally present in the emulsio to synthetic rubber to stop poly merization of unreacted polymerizable monomeric material, and thereafter removing unreacted polymerizable monomeric material from the latex.

Self-Extinguishing Asphalt

U. S. Patent 2,667,425. Lester A. Bierly, Chautauqua, N. Y., assignor to Presque Isle Laboratories and Manufacturing, Inc., Erie, Pa., a corporation of Pennsylvania.

A self extinguishing asphalt composition comprising a mixture of asphalt, chlorinated paraffin in the range 5-40%, and antimony oxide in the range of 5-40%, the combined weight of the chlorinated paraffin and antimony oxide being in the range of 25% to 100% of the asphalt, the chlorinated paraffin being at least 50% chlorinated. and the balance being substantially inorganic filler.

Rust Inhibiting Composition

U. S. Patent 2,665,995. John W. Bishop, Plainfield, N. J., assignor to Tide Water Associated Oil Company, Bayonne, N. J., a corporation of Delaware.

A composition adapted for use as a rust-inhibiting coating for metals, comprising a substantially non-corrosive vehicle in major amount based on the weight of said composition, and a small amount, sufficient to impart rust-inhibiting characteristics to said composition, of a hydrocarbon acid phosphate salt of an alkylol-containing amine having an alkylol group esterified with a hydrocarbon sulfonic acid.

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Nonvolatile	39-41%	39-41%
Solvent	Petroleum Spirits	Low Odor M.S.
Viscosity G.H.	J-P	P-W
Acid No. of Nonvolatile	5-10	3-10
Color (Gardner Std. '33)	10	10
Wt. per gallon at 25°C.	7.15-7.25	7.2-7.3

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PRODUCTION CLUB NEWS

(From page 34)

A motion picture on "The Operation of Ball and Pebble Mills" was presented by Oakley H. Garlick of Paul O. Abbe, Inc. The film dealt with speeds, viscosities, size of batches, size and quantity of grinding media and general information affecting the overall operation of Ball and Pebble Mills.

In addition the electrostatic spraying of finishes was demonstrated by means of a film in color from the Ransburg Electro-Coating Corporation.

Northwestern

The regular meeting monthly was held February 5, at the Town and Country Club in St. Paul, Minn.

Speaker of the evening, Franklin King, Jr. of Godfrey L. Cabot, Inc., discussed "Wollastonite, a New Mineral Extender."

He illustrated graphically, the comparison between calcium carbonate, wollastonite, calcium carbonate with diatomacious silica and magnesium silicate talc. In all cases, due to its low viscosity, higher pigment volume concentrations are possible.

He said Wollastonite's low oil absorption with high flatting efficiency makes it valuable as a new extender pigment. In addition, it is very bright and hard, which increases its resistance to mar and polish.

Mr. King added that Wollastonite has also proved very stable and non-reactive to latex paints, after 20 months storage. Its excellent sanding properties, coupled together with good enamel holdout make it ideally suited to primer surfacer formulations.

Louisville

The January meeting was held at th Seelbach Hotel. Franklin King, Jr of Godfrey L. Cabot, Inc., discusse "Wallastonite, A New Extender for th Painr Industry."

Slides illustrated the various feature of tests showing desirable performanc of the product in wall coatings an primers. Tests were described usi the extender in outside paints and i latex.

The next meeting was held Februar 17, also at the Seelbach Hotel.

Speaker of the evening was V. N. Sheets, of the Rohm & Haas Compan who talked on "New Acrylic Resins for Coatings." The synthesis of these resins and their properties for water base paints was described.

Philadelphia

Fred Shankweiler, Manager of Chlorinated Products Sales, Hercules Powder Company, showed a color movie on the varied uses of chlorinated rubber at the January meeting of the Club.

He devoted his time to three phases of its use: The Maintenance of Metal, The Maintenance of Masonry, and as a Product Finish in the Industrial Field.

C-D-I-C

The 336th meeting was held at Hoffman's Gardens, Columbus, O., on January 11.

At an earlier meeting of the Club's Technical Committee it was decided that the Club's paper for the annual convention would be "Low Odor Coatings."

Irwin Clare of the C. K. Williams Co., discussed "New Iron Oxide Pigments."

Montreal

Elias Singer, Technical Director of the Troy Chemical Company, delivered a paper on "Additives—A Tool in the Formulation of Organic Finishes," at the February 3rd meeting of the Club.

He emphasized in his paper how additives may be properly be used as an integral part of a formulation rather than as something to correct a deficiency in a paint. Among the types of additives covered were: architectural enamels, alkyd flats, white house paints, tinted house paints, and low cost finishes.

Toronto

The uses of trimethyloethane (TME) in formulations of new alkyd resins and improvement of existing types of surface coatings were discussed by Ely Balgley, Supervisor of New Product Development for the Heyden Chemical Corporation in a speech before the Toronto Paint and Varnish Club at the

Royal York Hotel on January 18.

This new derivative of formaldehyde has particularly important applications as a raw material in alkyd resins for use in surface coatings for home applications as a raw material in appliances, automobiles and industrial machinery.

Mr. Balgley said properties imparted by this solid trihydric alcohol to an alkyd resin include light initial color, good color retention, hardness, fast drying, excellent alkali resistance, good weather-ability, heat stability, compatibility with amino resins and fast alcoholysis.

He also reported on new uses of TME in the manufacture of high grade drying oils, plasticizers and surface-active materials.

New England

Dr. Arnold J. Eickhoff of the National Lead Company Research Laboratories spoke to the February meeting of the club on "Some New Aspects of Organophilic Ventonites."

The thixotropic gelling characteristics of Bentone 18C in strong polar type organic solvents make it of interest in such coating compositions as lacquers, vinyl resin solutions, and other systems which employ similar solvents.

A description of a modified viscometer and how it is used was included in the paper.

The Club discussed the suggestion of the National Secretary that the two publications "Standards and Methods of Test" and "Good Painting Practices" be sent for examination.

Cleveland

"Vinyltoulene—A New Step Forward in Vehicles" was the title of a paper given by V. L. Cipriano of the Dow Chemical Company at the February 19th meeting of the club.

Mr. Cipriano presented vinyltoulene as a new basic raw material available to the industry as one with many interesting possibilities. Typical applications and formulations were discussed.

Chairman Robert F. Hall announced that the plans for a telecast on April 11th are nearing completion. He also announced that the Federation through the Cleveland Club's exhortation has granted funds to the Case Institute of Technology for a paint fellowship.

The March 19th program will include a paper on acrylic emulsions by a representative of Rohm and Haas Company.

●

ADM 1954 Promotion Campaign To Include Handbooks on Room Design

As part of its Week-End Decorator Campaign, and Colorama Campaign for painters and contractors to boost paint sales, the Archer -Daniels-Midland Company, Minneapolis, Minn., will issue a series of room portfolios containing color schemes and decorating ideas.

First in the series, just released, is a "Colorful Bedrooms" portfolio which contains colored illustrations of 10 bedroom designs, reproduced from the actual color plates used in leading home decorating magazines published in this country.

The portfolio has been made available in two versions; for the paint dealer in building new sales to home owners and one for the painter-contractor as a sales aid with home owners.

Another promotional aid for the Week-end Decorators Campaign has been the publication of a booklet adapted from "Better Homes and Gardens Handyman's Book." The 68-page booklet contains ideas on how to save time and money in home painting and decorating projects.

●

Columbian Carbon Constructing Oil Process Carbon Black Plant

A new oil process carbon black plant with an ultimate annual capacity of 60 million pounds is being constructed by the Columbian Carbon Company, New York, N. Y., in St. Mary's Parish, La.

The new plant is located on the Intracoastal Canal near North End, La.

Binney & Smith, Inc., sales agent for Columbian's carbon black, will also handle sales of the carbon black produced in the new plant.

GLYCERINE TODAY

(From page 30)

million dollars a year on research without being out of line with some comparable chemical fields. It could be spending 750 thousand dollars on promotion, rather than about one-eighth of that.

Don't get me wrong, I am not advocating any such level as an Association project. But, it would be reasonable for the industry *as a whole* to do so, with the big bulk being spent by individual companies. In fact, I sometimes feel that the work of the Association has the aspects of a conscience fund. Having made this effort, we send our child forth to whatever fate Providence decrees. The other danger is this: brand loyalty is limited on a product of essentially similar structure. Therefore, Mr. A. sees his market development work giving Mr. B. a free ride. Mr. B., on the other hand, sees Mr. A. as a free-rider on anything he launches. So nobody budges. Meanwhile, market development money is concentrated on specialties with much narrower potentials.

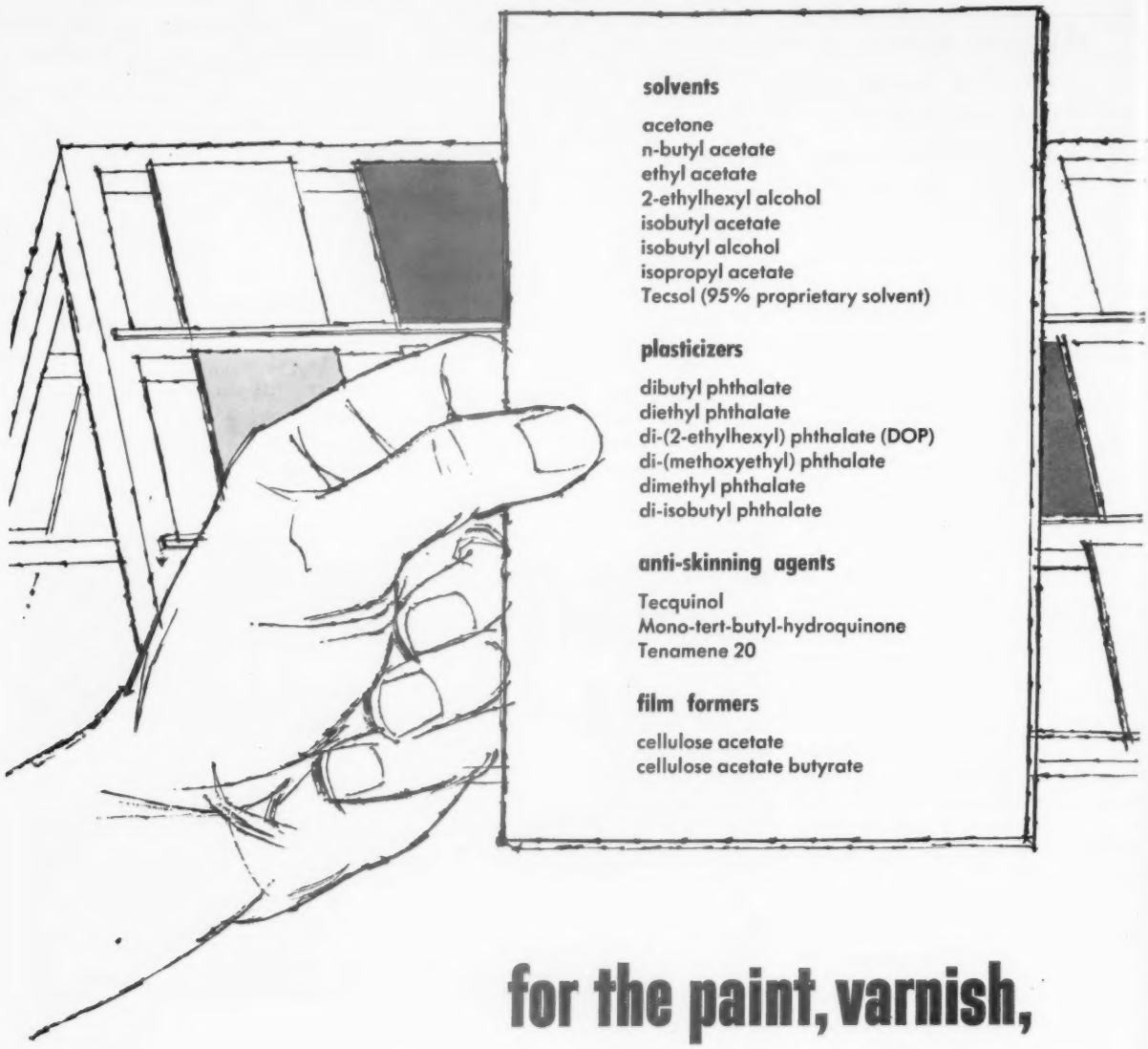
Now, frankly, it isn't as bad as all that. We get inquiries and news items every day indicating that the growth possiblities of glycerine are far from being neglected. Just recently in England, it has been proved important in a new aluminum coating process. Aceto stearins, made with glycerine, are getting commercial trial as plastic food coatings.

Biochemical work particularly is reconfirming the fact that glycerine is far more intimately linked with life processes than are other materials which have been trying to class themselves with glycerine as generic "polyols". This suggests the emergence of glycerine in new bodily uses—inside and out—which chemical additives of a different structure cannot successfully challenge. The mere long-term expectation of steady supply at practical cost level, if based on logical fact, will alter research attitudes and open up new possibilities.

One reason, particularly, gives me confidence in glycerine's future. The substitutes have made their challenge. They made it under conditions which were highly favorable to them. One way or another, in World War, hot war and cold war, the glycerine buyer has "had it"—but the broad base of product preference for glycerine has been maintained.

It does not follow that a decline in soap production presupposes a declining interest in glycerine on the part of soap producers. Quite the contrary, the importance of this co-product grows as supply trends become less inevitable. Glycerine may be a deciding factor in any decision between fats and non-fats.

There is growing evidence, I think, that everyone on the producing side of glycerine is coming to take a more long-term view to build commercial favor equal to the technical preference for the product. This includes the crude producers, who are giving increasing concern to product quality, and adopting the philosophy of a co-product rather than a by-product. It includes producers of all grades and types of glycerine, all offering services and assurances that conform to needs of steady demand. Perhaps, as a result, there will be less running to the nearest storm cellar . . . by producer one day, consumer the next . . . with each change in the economic climate.



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ethyl acetate
2-ethylhexyl alcohol
isobutyl acetate
isobutyl alcohol
isopropyl acetate
Tecsol (95% proprietary solvent)

plasticizers

dibutyl phthalate
diethyl phthalate
di-(2-ethylhexyl) phthalate (DOP)
di-(methoxyethyl) phthalate
dimethyl phthalate
di-isobutyl phthalate

anti-skinning agents

Tecquinol
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abstracts

Lead Cyanamide

Kotyloff, N., Peintures, Pigments, Vernis, 27 (1951) pp 695

For a number of years, experiments have been conducted in France to develop lead cyanamide into a pigment of maximum anticorrosive properties. A simple coat of lead cyanamide in linseed oil applied at a point north of Paris lasted satisfactorily for more than 2½ years in spite of the highly aggressive character of the prevailing local climate. Lead cyanamide was also subjected to a series of short-period tests in connection with alkyd resin vehicles, the tests consisting chiefly of frequently repeated periodic watering and drying treatments. The samples tested proved their corrosion resistance under these unfavorable conditions as well. Tested in mixture with chlorinated rubber the lead cyanamide, samples examined proved to be more rust-resistant than other approved anti-corrosive pigments such as red lead and zinc chromate (under the conditions applied).

The reasons for the remarkable anti-rusting effects of this pigment have been subject of extensive research in France, including even the application of the electronic microscope. Like other cyanamides, lead cyanamide is subject to slow hydrolysis, resulting in the formation of dicyandiamide and lead hydroxide. The former continues to be hydrolyzed into urea and ammonium carbonate, the ammonia formed as a final product rendering the water alkaline and anticorrosive.

The lead hydroxide, on the other hand, is precipitated in form of very fine particles which are absorbed by the iron surface, rendering it passive. The action of lead cyanamide is due to the fact that in connection with oil vehicles, it is partially converted into lead soaps, increasing the density of the film while if the aged film becomes permeable to moisture the lead cyanamide is decomposed, exerting a neutralizing influence on the moisture penetrating into and through the film.

Other favorable properties of lead cyanamide are its high covering power and the needle shape of the pigment particles. The length of these particles amounts to 0.001 to 0.004 mm, their width 0.0004 to 0.002 mm. At an oil requirement of about 35 cc./100 gr. of pigment, a lead cyanamide-linseed oil paint containing 65 percent of pigment exhibits a yield of about 8 sq.m. per kilogram of paint. (about 80 sq. ft. per 2.2 lbs. paint).

Electrical Approach to Particle Flocculation in Conc. Dispersions

Voet, A., J. M. Huber Corp., Borger, Tex. Presented before ACS Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Chicago, Ill., Sept. 6-11, 1953.

The electrical methods of investigation of particle flocculation in dispersions include the measurement of the dielectric constant, dielectric losses, and conductivity of dispersions in a quiescent state as well as when subjected to varying rates of shear.

The measurement of the dielectric constant provides the most significant interpretation for dispersions of particles with a dielectric constant which is high compared with the medium,

allowing the calculation of form factors and agglomeration factors. The influence of deflocculants may be numerically indicated, while particle orientation may be quantitatively established. The method fails to contribute important conclusions for particles with a dielectric constant not greatly different from that of the dispersion medium.

Dielectric loss data do not yield significant results for conductive particles due to the existence of eddy currents. For nonconductive particles changes in magnitude and location of the maximum in the dielectric losses vs. frequency curves provide a clue to changes in particle agglomeration.

Conductivity measurements are suitable for comparative results in systems of chain-forming conductive particles arranged in networks, where the direct current conductivity is a relative indication of the degree of flocculation. The influence of deflocculants and of the application of shear may be determined.

In systems of nonconductive particles the existence of particle networks cannot be detected with the aid of conductivity measurements. However, the conductivity increase with shear is connected with the number of freely moving particles and thus with the degree of agglomeration.

Temperature Indicating Paints

Cowling, J. E.; King, Peter; and Alexander, Allen L., Naval Research Laboratory, Washington, D. C. Presented at ACS, Div. of Paint, Plastics, and Printing Ink Chemistry, March 15-1[illegible], 1953, at Los Angeles, Calif.

For estimating maximum temperatures developed by remotely located components of aircraft in flight, colored marking pencils or "lacquers" which change color abruptly and permanently at specific temperatures have been found useful. Such materials as were available prior to World War II were, for the most part, of foreign origin and immediately became unavailable. This situation prompted a study of compounds of likely adaptability to this application. As a result, a number of inorganic coordination compounds were investigated for their color stability between a series of broad temperature ranges. In addition, several vehicles were investigated to provide a matrix which would not itself change color at somewhat elevated temperatures and confuse the color change of the primary indicator. Materials are described which may be used for estimating temperatures between 50° and *100°* C. and a second series ranging between 100° and 275° C. Some methods for the preparation of the salts are described along with their incorporation into a paint. Temperature ranges in which each suggested material is effective are defined.

Hot-Spray Finishes for Aircraft

Marchbank, J. W., and Gans, D. M., The Arco Co.; Mitchell, E. D., Douglas Aircraft Co., Inc.; and Piech, F. E., and Bracken, W. O., Hercules Powder Co., Wilmington, Del. Presented at at ACS, Div. of Paint, Plastics, and Printing Ink Chemistry, March 15-19, 1953, at Los Angeles, Calif.

Nitrocellulose lacquers, modified in solvent blend composition to permit application at elevated temperatures, have demonstrated economy and durability as a finish for naval high-speed aircraft. Practical lacquer heating equipment, of both the continuous and batch types, is available from at least ten U. S. manufacturers. Steam, hot water, hot air, and electricity are heating mediums.

The term "hot" may be a misnomer, since temperatures of lacquer will range from a predetermined 120° to 170° F. at the gun to room temperature or slightly above at the coated surface. No added precautions are necessary in the use of the hot-spray technique other than the good safety practices established in conventional spraying at room temperature of lacquers or synthetic enamels.

Advantages obtained in production finishing of aircraft are: fewer coats, smoother finish, reduced man-hours required for sanding and recoating, increased production, and savings in materials (lacquer and thinner).

Metal-Phosphate Pretreatments For Organic Coatings

Kronstein, M., Hixon, P., and Granowitz, J., College of Engineering, New York University, New York, N. Y. Presented at ACS Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Chicago, Ill., Sept. 6-11, 1953.

Studies are made on the content of still water-soluble matter is applied phosphate coatings on steel by immersing the panels in distilled water of known electrical resistance and then determining, during measured time intervals, the rate of drip of this resistance. In differentiating between the content of retained chemicals in the phosphate coating and the formation of water-soluble rust material on a steel surface, a modification of the ammonium molybdate method of Preston, Settle, and Worthington is being applied.

The influence of the removal of the retained soluble matter on increased paint bonding under salt-fog exposure is studied on two zinc phosphates and two iron phosphates. As paint on OD paint of Federal Specification TT-E-485b, Type 11 is used. The state of the panels during the exposure series is studied by applying, at certain time intervals, the electrographic printing method.

Catalysis by Complexes—Drying of Linseed Oil

Zettlemoyer, A. C. and Myers, Raymond R., National Printing Ink Research Institute, Lehigh Univ., Bethlehem, Pa. Presented at ACS Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Chicago, Ill. Sept. 6-11, 1953.

Economical replacement of conventional drying catalysts for oleoresinous vehicles by metal complexes has been demonstrated. A means has been shown whereby cobalt can be replaced by manganese and iron in conjunction with a suitable amine additive. In some cases manganese catalysis was improved to the point at which it was superior to cobalt catalysis; in general, the greatest improvement occurred with diamines or other difunctional amines possessing resonant structures and by certain amines of large steric requirement. Iron was susceptible to improvement by the same types of amines and to a greater extent in proportion to its original activity than was manganese.

The finding that catalysis by manganese can be enhanced by relatively inexpensive compounds may constitute the first step toward developing a new drier technology, based on discoveries of early workers that synthetic coordination complexes can be made to function as driers.

Mechanism of Drier Action

Mueller, E. R., Organic Coatings Div., Battelle Memorial Institute, Columbus, O. Presented before ACS Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Chicago, Ill., Sept. 6-11, 1953.

The probable mechanism of the action of metallic driers is discussed in relation to the generally accepted theories, now fairly well established, for the manner in which drying oils and air-drying finishes gel or "set". A brief review of peroxidation and polymerization mechanisms for drying oils and air-drying finishes precedes the discussion of the role of the driers.

Experimental work on several air-drying varnishes is presented. It was shown that the maximum infrared absorption in the 2.9 micron band (which measures –OH) was greatest up to the "set" time. Moreover, if this is correlated with the ultraviolet and peroxide development data of other workers, there appears to be an excellent relationship between peroxide development, induced conjugation, and peroxide decay. When two "optimum" driers are used which differ considerably in composition but produce the

same overall drying times, the infrared data almost exactly superimpose each other. This is taken as evidence that the mechanism of the action of these driers is similar at 30°C.

It is postulated that the principal role of the driers is to initiate peroxidation so that the autoxidation can proceed. It is theorized that driers initiate short-lived chain reactions. The concentration of driers is significant until a level is reached to obtain maximum speed of peroxide development.

Several mechanisms by which driers may help produce free radicals are presented.

Microstructure of Paint Films

Bobalek, E. G., LeBras, L., and von Fischer, W., Case Institute of Technology, Cleveland 6, O. Presented at ACS Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Chicago, Ill., Sept. 6-11, 1953.

Liquid-solid interfacial phenomena can cause varying conditions of dispersion or flocculation which influence the structural distribution of pigments in paint films. These effects influence the appearance of the film with respect to color and luster.

While rheological and sedimentation measurements on liquid paints provide some information regarding solid-liquid dispersions, there are very few data to show how such information is significant in predicting the qualities of structure and appearance of films prepared from such paints.

The electron microscope is a feasible tool for studying film structure; however, it has been little used on paint films because of technical difficulties. These difficulties have been partially solved, and some possibilities are suggested for use of electron microscopy in explaining color and luster variations in terms of differences in film structure.

The aspects of film structure that can be observed most easily are: surface structure of the resinous binder, extent of flocculation or dispersion of the pigment, and sedimentation of the pigment in the film. It may be possible to correlate these aspects of film structure with physical-chemical data on the liquid paint.

Dispersion Studies-Floating Roll Mill

Maus, L., Zettlemoyer, A. C., and Walker, W. C. Presented before ACS Meeting, Div. of Paint, Plastics, and Printing Ink Chemistry, Chicago, Ill., Sept. 6-11, 1953.

For many years the three-roll mill has been used in the paint and printing ink industries with a fixed center roll and screwjack adjustments at the four corners to bring the outer rolls to bear against the center roll. This design has had inherent difficulties of adjustment and control. Its operation has become a highly developed art with several schools of thought on proper technique.

Earlier work in this laboratory on the basic engineering principles of roll mill operation led to the development of the "floating roll" mill which simplifies the adjustment and control problems inherent in the conventional design. In the floating roll mill one of the end rolls is fixed; the center roll is free; and forces are exerted on the bearings of the other end roll to bring the rolls together. The center roll is self-aligning and allows adequate adjustment from only two points. The reduction in adjustment points from four to two reduces the number of possible ways of misadjustment from eighty to eight.

In spite of the fact that the floating roll mill does no better dispersion than does a properly set conventional mill, at least seventy-five floating roll mills are being used in industry at an average reported production increase of 5% because of simplified adjustment.

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For large volume processing where color retention is not essential, you can produce harder, tougher finishes and save money with Neo-Fat 130. This dependable, quality-controlled, unsaturated fatty acid is specially made to fill a gap in the alkyd raw material market, giving you an extremely low-priced yet consistent alkyd chemical for quantity production. (Titer . . . 28°C. Max.,—Iodine Value . . . 125 Min.—Acid Value . . . 195 Min.—Color Max. . . . 4 Gardner.)

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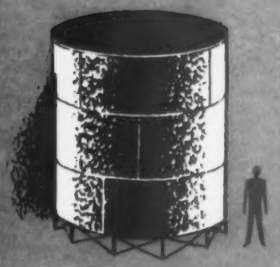

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DESIGNING EQUIPMENT

(*From page 27*)

ferent materials. Going through a heating and cooling cycle first stresses the materials in one direction due to temperature differences between the parts, then allows a residual stress due to differences in thermal expansion rates and finally reverses the direction of stress application. Unless provision is made to reduce or eliminate these stresses, the jacket or shell material will deform, and bending stresses will be applied at the closure joints. The exact nature of the stress application and the amount of stress depend on the physical properties and thickness of the sections in addition to the temperature differences. The amount of deflection which the expansion joint must provide depends in addition on the length of jacketed section. Similar considerations apply to spray cooling jackets. This discussion of thermal stresses has been a simplification of a complex problem, however, it indicates the necessity for precautions.

Agitation

The question frequently arises, "What is the best type of mixing impeller to use?". According to published literature, pitched blade turbines are poorest from the heat transfer standpoint, but where the solvent process is to be used, the axial flow effect of the single or dual pitched blade turbine agitator is very desirable. Two pitched blade impellers are more efficient than one turbine and one propeller or two other types of turbines, so far as introducing reflux return solvent into the batch.

Water reaction is removed by the process of additive vapor pressures of the water and the solvent. Since the non-volatile components of the cook exert extreme vapor pressure lowering effects, it is very important to insure that the solvent contact the water of reaction, and to bring both to the surface to avoid additional hydrostatic boiling point elevation effects.

Since the quantity of flow induced by the impeller is proportional to the cube of the diameter and to the speed of rotation to the first power, larger diameter, slower moving impellers are more desirable than smaller high speed impellers. Similarly, heat transfer is more rapidly affected by diameter than by speed of rotation. Opposed to the use of larger slow moving impellers is the fact that power increases much more rapidly with the diameter than with the speed of rotation.

In using data obtained from existing kettles as a basis of design for kettles of different capacity, it is necessary from the mixing standpoint to maintain identical geometric proportions, and identical flow patterns. Providing fully baffled flow conditions prevail, it is then possible to accurately estimate the effects of altering dimensions and speeds of rotation, and to quantitatively predict the power required per unit volume to obtain the same results obtained in the proto-type unit. This quantity is not a fixed number, but declines with increasing kettle size.

It is hoped that this discussion will be of help to the production man considering the installation of new equipment or the revamping of existing units.

CALENDAR OF EVENTS

Mar. 24-27. ACS Spring Meeting. Div. of Paint, Plastics, and Printing Ink Chemistry, Hotel Aladdin, Kansas City.

Mar. 25-27. West Coast Symposium sponsored by West Coast Production Clubs. Fairmount Hotel, San Francisco, Calif.

April 29-May 1. Annual Joint Meeting of Dallas-Houston Production Clubs, Adolphus Hotel, Dallas, Texas.

June 13-18. ASTM Annual Meeting. Sherman and Morrison Hotels, Chicago, Ill.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmillers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Buildng.

Golden Gate, Last Monday, E. Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Wednesday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

TECHNICAL Bulletins

AGITATED KETTLES

Its standard line of agitated kettles is described in brochure just issued by the Colonial Iron Works Co., 17643 St., Clair Ave., Cleveland 10, O.

Among the units discussed are autoclaves, hydrogenators, mixers, neutralizers, polymerizers, reactors, sulfonators, and other standard and custom-made products.

In addition to photographs, the brochure is profusely illustrated with a wide variety of engineering drawings, charts, tables and graphs.

Copies may be obtained by writing firm.

FILTERS

To aid engineers and purchasing agents in the chemical and processing industries, the Niagara Filters Division of the American Machine and Metals, Inc., East Moline, Ill., has made available a new catalogue on the complete line of Niagara filters.

The publication is a 20-page brochure fully illustrated with photographs, diagrams and charts on the design and operation of the firm's pressure-leaf filters. It includes complete information on the new type "H" horizontal filter recently introduced by the company.

In addition, complete data on sizes capacities and dimensions for both vertical and horizontal filters are listed.

ETHYL ALCOHOL

Technical Data Sheet No. 21 on ethyl alcohol has been published by the Commercial Solvents Corporation, 260 Madison Ave., New York 16, N. Y.

The four-page publication lists general information on ethyl alcohol, specifications and physical property charts, and a listing of grades and types. In addition, the bulletin contains information on government regulation concerning use of the product, toxicity data and shipping, handling and storage advice.

MICA IN LATEX

Technical Bulletin No. 16, titled, "Studies on the Behavior of Mica as a Pigment Material in Latex Paints—Part III, has been issued by the Wet Ground Mica Association, Inc., 420 Lexington Ave., New York 17, N. Y.

The bulletin contains a photographic record of the effect of the selection of the foam decreasing agent on the pigment dispersion in three latex paints, using three different mica contents in the pigmentation and using the same latex-casein.

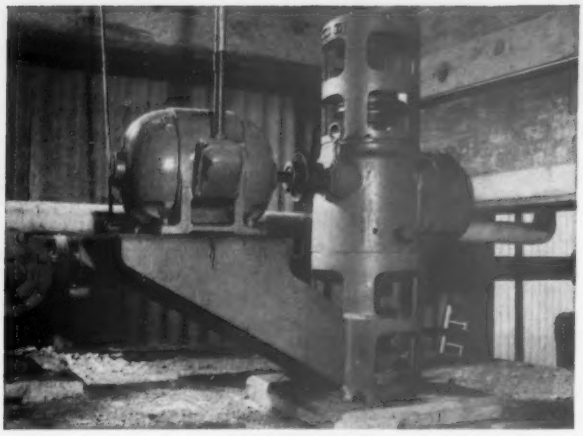
In addition, the publication contains tables on the effect of exposure to ultraviolet lamps of test paints on glass panels.

ZEIN

The Mellon Institute of Pittsburgh, Pa., has issued Bulletin No. 7 on Zein, an annotated bibliography prepared by Dorothy M. Rathmann.

The 118-page publication, latest in a bibliographic series being issued by Mellon Institute, consists of 942 citations comprising 256 U. S. patents, 224 foreign patents, 374 journal articles, and 88 books and general review articles.

The table of contents includes chapters on: Chemical Properties, Reactions, Physical Properties, Solvents for Zein, Plasticizers, and Applications and Uses.



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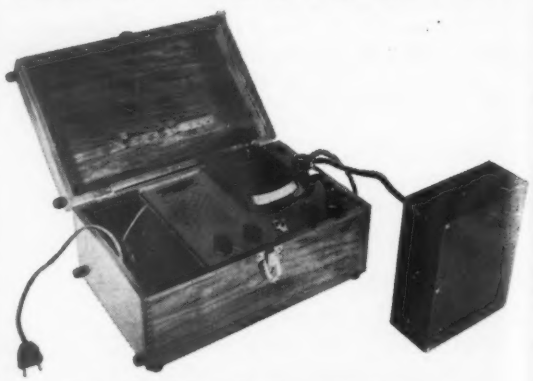

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FATTY ACIDS

Emery's new structurally modified fatty acids are described in a new booklet titled, "Emery Modified Fatty Acids," just issued by Emery Industries, Inc., Cincinnati, O.

Publication covers typical characteristics and properties of modified fatty acids. It also discusses some effects of their unconventional behavior in finished products.

For copies of booklet write Emery's Development and Services Dept., 2504 Carew Tower, Cincinnati 2, O.

SOLVENTS CHARTS

Complete physical specifications of eight solvents are listed on data chart offered by the John B. Moore Corp., Nutley, N. J.

The chart, pre-punched for standard 3-ring binder, folds once to letter size and also lists suggested uses. Location of the company's field engineers and warehouse points appear on the back.

Copies of Solvents Chart "CD" may be obtained by writing the firm at P. O. Box 13, Nutley, N. J.

GELLING AGENTS

Technical service bulletin on its gelling agents for polyvinyl chloride compositions has been published by the Witco Chemical Company, 260 Madison Ave., New York 16, N. Y.

The gelling agents described are Witco Sodium Stearate T-1 and Aluminum Stearate 22. The publication lists their uses and recommended procedures in their applications.

PAINT ADDITIVE

Nuosperse 657, a wetting, dispersing and anti-settling agent, is discussed and its uses described in a brochure offered by Nuodex Co., Inc., Elizabeth, N. J.

The six-page, two-color publication is made up chiefly of questions and answers about Nuosperse 657. Queries cover such topics as the effect of the additive on film hardness, durability, yellowing of white enamels, rate-of-dry of finish product, viscosity, and pigment floating.

The brochure also includes a table of physical constants.

METAL PHOSPHATE

A 12-page booklet entitled, "Solubility Factor in Metal Phosphate Pre-Treatments" is available for 35 cents from the Office of Information Services, New York University, University Heights, New York City, 53.

The paper, which was prepared by Dr. Max Kronstein, Philip Hixon, and Jack Granowitiz of the Research Division of the College of Engineering, describes new methods of measuring chemical conversion during pre-treatments of steel surfaces and the effect on paint bonding.

Reprinted from the December 1953 issue of *Paint and Varnish Production*, the article discusses water-soluble matter in the phosphate coating and the effect of chemical remnants in phosphate treatments on paint bonding qualities. It contains charts and photographs.

ALCOHOLS

Fifty-two page book discusses in detail the 20 alcohols now sold in commercial quantities by Carbide and Carbon Chemicals, Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd St., New York 17, N. Y.

The book has been prepared as a handy reference for people in the chemical industry: chemists, engineers, purchasing agents, and production and laboratory workers. Uses and suggested applications for the alcohols, their physical properties, shipping data, specifications, test methods, constant-boiling mixtures, and a list of selected references to these alcohols in the technical literature are included.

Copies may be obtained by writing the firm.

LAB EQUIPMENT

Bulletin No. 700 on "Laboratory and Pilot Plant Equipment" has been published by the Andrew Technical Service, 6972 N. Clark St., Chicago 26, Ill.

The publication contains illustrations and data on attrition mills and portable mullers; proportioning pumps, blending machines for powdered materials; electric-heat autoclaves; steam jacketed sterilizers; hand-drive and motor-drive tumble-jars; cabinets for accelerated testing under controlled conditions of salt fog and humidity; instrument needle-valves with vernier action; portable refrigerators.

Bulletin sent free upon request.

HANDLING EPON RESINS

Technical bulletin containing recommendations for the handling of epon resins and their formulations has been published by the Shell Chemical Corporation, 500 Fifth Ave., New York 36, N. Y.

The publication contains information on suggested industrial hygiene practices, such as personal hygiene, protective devices handling procedures, remedial measures and fire control.

REICHHOLD STORY

An illustrated booklet outlining Reichhold Chemicals, Incorporated's founding and growth has been published by the company.

The booklet contains sections on the growing use of synthetic resins, a brief history of how Henry H. Reichhold founded and guided the development of his firm, descriptions of Reichhold plants in the United States and abroad, and a listing of products produced and their applications.

PETROLEUM SOLVENTS

A buyers' guide to petroleum solvents and their properties has been presented by the American Mineral Spirits Company, 155 East 44th St., New York, N. Y.

It's a four-page, file-type folder designed to save time in choosing the correct solvent for individual product needs.

The guide contains a list of aliphatic napthas, paraffinic hydrocarbons, and aromatic hydrocarbons and solvents including their typical properties.

Copies available upon request.

HYDROMETERS

A 36-page catalog of hydrometers and thermometers has just been published by the Emil Greiner Co., 20-26 North Moore St., New York 13, N. Y.

The catalog, available without cost, features nearly 1,000 models all made in accordance with requirements of the National Bureau of Standards, A.S.T.M., A.P.I. and other official sources of standard specifications., according to a firm release.

CLASSIFIED ADVERTISEMENTS

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